MARY D ROGICK

MARY DORA ROGICK
25 PROSPECT STREET, APT. 1-K
NEW ROCHELLE, NEW YORK

Pls. 52–60 ; 65–68, 75, 87–90, 94–97

MARINE BIOLOGICAL LABORATORY
LIBRARY
WOODS HOLE, MASS.
ROGICK COLLECTION

Natural History of Victoria.

PRODROMUS

OF THE

ZOOLOGY OF VICTORIA;

OR,

FIGURES AND DESCRIPTIONS OF THE LIVING SPECIES OF ALL CLASSES

OF THE

VICTORIAN INDIGENOUS ANIMALS.

DECADE VI.

BY

FREDERICK McCOY, F.R.S.,

HONORARY FELLOW OF THE CAMBRIDGE PHILOSOPHICAL SOCIETY; HONORARY ACTIVE MEMBER OF THE IMPERIAL SOCIETY
OF NATURALISTS OF MOSCOW; CORRESPONDING MEMBER OF THE ZOOLOGICAL SOCIETY OF LONDON;
HONORARY MEMBER OF THE ROYAL SOCIETY OF NEW SOUTH WALES; HONORARY MEMBER OF SEVERAL OTHER
SCIENTIFIC SOCIETIES, ETC.
PROFESSOR OF NATURAL SCIENCE IN THE MELBOURNE UNIVERSITY.
DIRECTOR OF THE NATIONAL MUSEUM OF NATURAL HISTORY AND GEOLOGY OF MELBOURNE, ETC.

MELBOURNE:
BY AUTHORITY: JOHN FERRES, GOVERNMENT PRINTER.
PUBLISHED BY GEORGE ROBERTSON, LITTLE COLLINS STREET.
LONDON: TRÜBNER AND CO., 57 AND 59 LUDGATE HILL; AND GEORGE ROBERTSON,
17 WARWICK SQUARE.

M DCCC LXXXI.

Natural History of Victoria.

PRODROMUS

OF THE

ZOOLOGY OF VICTORIA;

OR,

FIGURES AND DESCRIPTIONS OF THE LIVING SPECIES OF ALL CLASSES

OF THE

VICTORIAN INDIGENOUS ANIMALS.

DECADE VI.

BY

FREDERICK McCOY, F.R.S.,

HONORARY FELLOW OF THE CAMBRIDGE PHILOSOPHICAL SOCIETY; HONORARY ACTIVE MEMBER OF THE IMPERIAL SOCIETY
OF NATURALISTS OF MOSCOW; CORRESPONDING MEMBER OF THE ZOOLOGICAL SOCIETY OF LONDON;
HONORARY MEMBER OF THE ROYAL SOCIETY OF NEW SOUTH WALES; HONORARY MEMBER OF SEVERAL OTHER
SCIENTIFIC SOCIETIES, ETC.
PROFESSOR OF NATURAL SCIENCE IN THE MELBOURNE UNIVERSITY.
DIRECTOR OF THE NATIONAL MUSEUM OF NATURAL HISTORY AND GEOLOGY OF MELBOURNE, ETC.

MELBOURNE:
BY AUTHORITY: JOHN FERRES, GOVERNMENT PRINTER.
PUBLISHED BY GEORGE ROBERTSON, LITTLE COLLINS STREET.
LONDON: TRÜBNER AND CO., 57 AND 59 LUDGATE HILL; AND GEORGE ROBERTSON,
17 WARWICK SQUARE.

M DCCC LXXXI.

PREFACE.

It having been considered desirable to ascertain accurately the natural productions of the Colony of Victoria, and to publish works descriptive of them, on the plan of those issued by the Governments of the different States of America, investigations were undertaken, by order of the Victorian Government, to determine the Geology, Botany, and Zoology of the Colony, to form collections illustrative of each for the public use, and to make the necessary preparations for such systematic publications on the subject as might be useful and interesting to the general public, and contribute to the advancement of science.

As the geological and botanical investigations have already approached completion, and their publication is far advanced, it has been decided to now commence the publication of the third branch completing the subject, namely, that of the Zoology or indigenous members of the different classes of the animal kingdom.

As the Fauna is not so well known as the Flora, it was a necessary preliminary to the publication to have a large number of drawings made, as opportunity arose, from the living or fresh examples of many species of reptiles, fish, and the lower animals, which lose their natural appearance shortly after death, and the true characters of many of which were consequently as yet unknown, as they had only been described from preserved specimens. A Prodromus, or preliminary issue, in the form of Decades, or numbers of ten plates, each with its complete descriptive letterpress, will be published, of such illustrations as are ready, without systematic order or waiting for the completion of any one branch. The many good observers in the country will thus have the means of accurately identifying various natural objects, their observations on which, if recorded and sent to the National Museum, where the originals of all the figures and descriptions are preserved, will be duly acknowledged, and will materially help in the preparation of the final systematic volume to be published for each class when it approaches completion.

This sixth Decade gives figures and descriptions in the first plate of a new species of one of those curious Lizards which deceive the popular judgment by assuming the form of Snakes so nearly as to be often mistaken for them.

The second plate figures another of our rarer poisonous Snakes, too small to be dangerous to man, but of a most striking style of coloring disposed in black and white rings, quite unlike any other Australian land Snake, but like some of the Sea-Snakes in this respect, and in this and other characters reminding us of some types peculiar to South America.

The third plate shows the characters of our beautiful green and gold Frog, with the various stages of its metamorphosis from the Tadpole aquatic state, by gradually acquiring legs and losing its tail, to the tail-less terrestrial air-breathing form, with four powerful limbs.

The fourth and fifth plates show the characters of the dissimilar male and female of one of the most gorgeously colored Fishes of our seas, the *Aulopus*, especially remarkable for showing the small ray-less adipose dorsal fin near the tail, considered until lately to characterise the *Salmonidæ*, all of which, whether Trout or Salmon, possess it.

The sixth plate gives evidence of the identity of Victorian specimens of that extraordinary Fish, the Hammer-headed Shark, with the European type; and figures for the first time another anomalous Shark, our common Saw-Fish (*Pristiophorus*).

The four following plates continue the illustrations of our wonderfully rich Polyzoan Fauna contributed by Dr. MacGillivray to the National Museum and this work, in which many of them are figured for the first time.

The succeeding Decades will illustrate as many different genera as possible, and will deal first usually with species of some special interest, and of which good figures do not exist, or are not easily accessible.

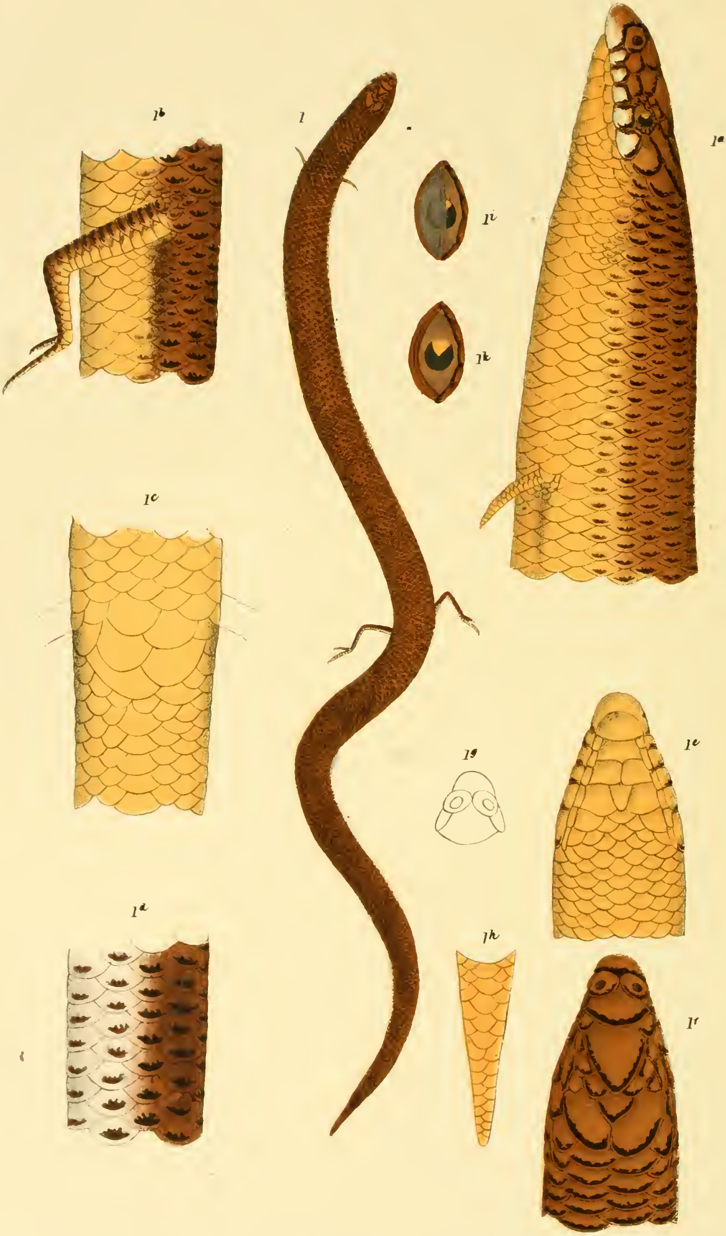
FREDERICK McCOY.

25th August 1881.

Pl. 51

ZOOLOGY OF VICTORIA

(Reptiles)



A. Bartholomew del. et lith. Prof. McCoy direxit. Steam litho, Govt. Printing Office

PLATE 51.

RHODONA OFFICERI (McCOY).

THE VICTORIAN RHODONA.

[Genus RHODONA (GRAY) = BRACHYSTOPUS (DUM. & BIB.) = RONIA (GRAY). (Sub-kingd. Vertebrata. Class Reptilia. Order Sauria. Sub-ord. Leptoglossæ. Tribe Geissosaura. Fam. Scincidæ.)

Gen. Char.—Body and tail cylindrical, elongate ; tail conical, pointed, with 3 or 5 rows of large scales on under side. Legs 4, rudimentary, far apart ; anterior ones very small, tapering to a point, simple, not divided into toes ; hind pair larger, divided into two cylindrical toes with claws, the outer toe about twice the length of the inner one. Head semiconical, depressed, convex above, subcuneiform at tip ; rostral plate depressed, sharp-edged, very wide, triangular, rounded in front ; 2 fronto-parietal plates ; nasal plates large, triangular, converging in front, each with the superior lateral nostril in the middle ; no supra-nasals. Tongue flat, granular, notched at tip ; palate with a short posterior groove, and no teeth ; teeth on jaws conic, blunt ; ear a minute, depressed point ; eyes small, lower eyelid transparent ; surface of body smooth, glossy. Scales smooth, not keeled. (Dr. Günther describes *R. fragilis*, from Peak Downs, as having the anterior as well as posterior legs with three fingers each, in the Journal des Museum, Godeffroy Heft., xii., p. 45 ; and he describes *R. Gerrardi* as having 1 toe on one side and 2 on the other of the anterior limb.)]

DESCRIPTION.—Head obtusely pointed in front, moderately depressed, a little wider behind than the neck, from which the body tapers gradually to tip of tail; back and belly of body slightly flattened, tail circular in section. *Plates:* 6 labials, the fourth forming lower edge of orbit, the upper two-thirds of orbit bordered by 1 to 3 rows of small scaly plates; rostral large, pentagonal, obtuse-angled above ; nasals large, joining with only small suture ; 1 loreal and 2 anterior ocular small plates between eye and nasal ; fronto-nasal, or prefrontal, transverse, nearly twice as wide as long, rounded behind, length equalling frontal and suture of contact of nasals ; next central plate, or frontal, subpentagonal or nearly triangular, length equalling from tip of snout to its front edge ; next median plate, or occipital, small, subrhombic, slightly less than half the length of the preceding frontal; 3 smaller plates extend on each side from it to the superior ocular ; a large parietal plate on each side about equalling the frontal and half of the prefrontal in length. *Scales:* about 18 rows round middle of body, those of belly smaller than back ; 26 from gape of mouth to to base of front leg ; from thence to base of hind leg, 87 ; middle row under tail rather larger than those of sides or back of tail ; 2 large pre-anal scales. Anterior limb as long as four and a half of the adjacent scales, about half the length of the gape, ending in a small conical point, and lodged in a channel. Hind limb with two toes, the outer rather more than twice the length of inner one, each with a minute conical claw. Ear-opening a very small depressed pore surrounded by a patch of smaller scales on each side. *Color:* head above the labials and dorsal half of body rich hazel-brown ; labial plates, throat, and lower half of sides and belly very pale yellow-ochre ; lower half of tail very pale lilac, irregularly flecked with dark-brown, and a slight tinge of the same on dorsal half, rendering the tail darker than the body ; 8 to 10 longitudinal rows of black spots, produced by a corresponding number of the transverse rows of scales above, having each an irregular, vertical, lunate, jagged blotch of black a little behind its middle, those of tail larger than on body. The labials and plates of head each with a brown blotch near posterior edge; anterior limb all yellowish, posterior limb yellowish below, closely freckled with brown above. Total length, 7¾ inches, of which the tail is one-half. Length of gape, 4 lines; greatest width of head, 3½ lines; length of anterior limb, 2 lines, of posterior limb, 6 lines.

This is one of several most interesting little Lizards resembling Snakes so completely in external appearance as to deceive the popular observers, who frequently send me the more common kinds with the enquiry as to whether they are poisonous Snakes or not. Like even the most snake-like Lizards the jaws in this are not dilatable as those of all Snakes are, and it has distinct, though very small, external ears, looking like impressed pores, which no Snakes have. No Snakes have movable eyelids, while they are not only present in this little creature, but exhibit a curious provision for preventing the sand, into which it likes to burrow, from damaging the eye, and at the same time allows sufficient vision, owing to the perfect transparency of the middle of the eyelid. When the fierce north wind raises the clouds of summer dust into a "brickfielder," we might feel inclined to envy the *Rhodona* and wish we could shut our eyes and have a transparent spot in the lid to look through with impunity.

The limbs lodge in hollows so as not to project beyond the surface when retracted, thus offering no resistance while burrowing.

The specimen figured, which is the only one seen as yet, was given to me alive by Mr. Charles Officer, M.P., and was kept in a bottle of sand for some weeks. If brought to the surface, it arched the anterior part of the body, and, plunging the narrow wedge-shaped front of snout into the sand, quickly burrowed out of sight; the highly polished surface of the scaled body, as smooth as glass, obviously suiting this habit to perfection. I could not induce it to feed in confinement, nor would it eat flies for Mr. Officer, who kept it a week or two before I saw it; but perhaps, like its near ally, the English Slow-worm, or Blind-worm (*Anguis fragilis*), it may eat slugs and worms when at liberty.

In the proportional length of the anterior limb this new species is intermediate between *R. punctata* (Gray)* = *Ronia catenulata*

---

* An. Nat. Hist., ii., 335.

(Gray),* and the *R. Gerrardi* (Günth.)† of Swan River, the *R. punctata* having it as long only as one scale of the sides of the body, *R. Gerrardi* has it as long as six scales, while in the present one it is equal to four and a half of the adjoining scales.

Locality : rare in the loose sandy soil of the plains on the banks of the Murray. The type specimen was found about one mile from the river and two miles from Swan Hill.

EXPLANATION OF FIGURES.

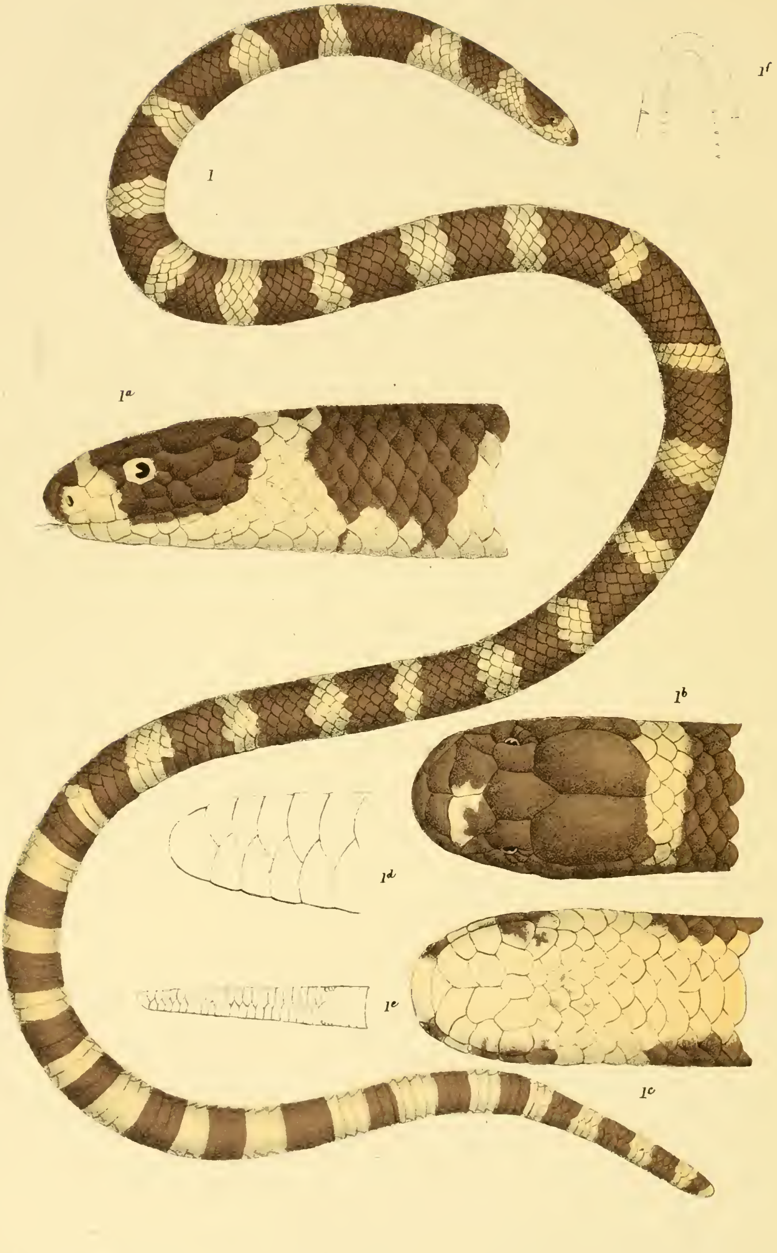
PLATE 51.—Fig. 1, dorsal view, natural size. Fig. 1*a*, side view, enlarged four diameters, of anterior portion of body, to show the disposition of the colors, the relative positions of nostril, eye, and ear (the place of the latter marked by a dotted line), and the form, relative size, and scaling of the simple anterior limb. Fig. 1*b*, hind limb and part of body, magnified four diameters. Fig. 1*c*, anal and subcaudal scales, with place of base of hind limbs, magnified four diameters. Fig. 1*d*, side view of middle of tail to show color and markings. Fig. 1*e*, under view of head, magnified four times. Fig. 1*f*, upper view of head, magnified four times. Fig. 1*g*, rostral, nasal, and following plate, magnified four times. Fig. 1*h*, under side of tail, magnified four diameters. Fig. 1*i*, eye, showing the transparent lid half closed, magnified. Fig. 1*k*, eye, with eyelid open, magnified.

FREDERICK MCCOY.

---

* Grey, Journal of Two Expeditions of Discovery in Australia, v. 2, p. 487.

† An. Nat. Hist. v. 20 July 1867, p. 46.



A. Bartholomew del et lith *Prof. McCoy direxit* *Steam litho. Govt. Printing Office*

PLATE 52.

VERMICELLA ANNULATA (GRAY).

THE BLACK AND WHITE RINGED SNAKE.

[Genus VERMICELLA (GRAY). (Sub-kingd. Vertebrata. Class Reptilia. Order Ophidia. Fam. Elapsidæ.)

Gen. Char.—Body elongate, cylindrical ; head thick, blunt, rounded, little wider than the neck ; rostral plate moderate, rounded ; nasal large, with the small nostril pierced near the middle ; one large anterior ocular plate, and two small posterior ocular plates. Scales subequal (vertebral line not larger than the others), smooth, imbricated, about fifteen rows ; anal and sub-caudal plates in two rows. Tail very small, conical. One minute, grooved fang, and no other teeth in jaw. Australia.]

DESCRIPTION.—*Form:* body long, slender, cylindrical; tail slender, conical, ending in an obtuse conical point, covered by a polished conical scale; head no wider than the neck, only slightly flattened, obtusely rounded in front. *Scales:* moderate, rhombic, smooth, 15 rows across middle of body ; abdominal plates moderately wide, varying from 212 to 229; subcaudal plates varying from 24 to 19 pairs. *Plates:* rostral shield large, obtusely rounded, obtuse angled or rounded behind, nasal plate large, touching the posterior frontal, anterior ocular large, a little shorter than the nasal; 2 posterior oculars, small, scarcely equalling the diameter of the eye in length ; anterior frontals small, twice as wide as long; posterior frontals about twice as long as anterior one, a little wider than long; vertex plate, subpentagonal, subtruncate and broadest in front, about one-third longer than wide, occipitals rather narrow, subtrigonal; six upper labials, the 2nd, 3rd, and 4th labials touch the eye ; anterior temporal large, two posterior temporals together shorter than anterior, in contact with the upper or lower posterior ocular. *Color:* yellowish white, with about 32 to 42 transverse brownish-black rings, about six scales wide on back, separated by white intervals about 3 scales wide, more nearly equal below, where each color occupies about 3 or 4 scales wide; throat white ; rostral and anterior frontal plates and anterior half of nasal plate black ; labial plates, anterior ocular, and posterior frontals white ; superciliary, vertex, and occipital plates black. *Teeth:* one small poison fang on each side, no other teeth in jaws, two rows of about 5 small teeth on palate. Length usually about 2 feet, of which the tail is 1 inch 5 lines, cleft of mouth 6 lines, greatest width of body, 6 lines.

REFERENCE.—Snake No. 2. White Journal. New South Wales, Ap. p. 259. Günther, Cat. Col. Sn. B. M., p. 236.

This is one of the rarer Snakes of Victoria, and does not occur much further south than Sandhurst. It is impossible to confound it with any other land Snake from its striking colors arranged in numerous, nearly regular, alternate black and white bands. These colors are nearly pure when the skin has been newly changed, but the white gets a slight yellow tinge, and the black a brown coat, when the skin is old ; the pattern varies a little on the head, and the figured specimen differs from all the others in having the black bands wide and including a white patch, below. The curious peculiar character of having no teeth behind the fang in the upper jaw is quite clear in all the specimens examined. The size of the ocular plates varies in the different specimens ; and in the one figured the fourth labial plate is divided so as to give an erroneous appearance of a third posterior ocular, which does not exist in the other specimens.

The following table gives the number of scales and measurements of four of the specimens in the National Museum collection :—

Specimens.	Scales of Back.		Lower Plates.		Length.		Color Rings.
	Across middle.	Over base of Tail.	Abdomen.	Tail (pairs).	Total.	Tail.	
					ins. lines.	ins. lines.	
Figured specimen	15	14	223	23	20 0	1 3	35
2nd, from Lake Cooper ...	15	15	229	19	25 0	1 5	42
3rd, „ „ ...	15	15	217	24	19 0	1 5	40
4th	15	15	212	24	16 6	1 3	32

Explanation of Figures.

Plate 52.—Fig. 1, average specimen, natural size. Fig. 1*a*, profile of head, enlarged three diameters. Fig. 1*b*, top view of head, magnified three times to show the form and disposition of the plates. Fig. 1*c*, lower side of head, magnified three diameters. Fig. 1*d*, under side of tip of tail, magnified four diameters. Fig. 1*e*, under side of tail, showing the two rows of sub-caudal plates and a few of the abdominal plates ; natural size. Fig. 1*f*, interior of mouth, magnified to show the two fangs and two rows of palatine teeth.

Frederick McCoy.

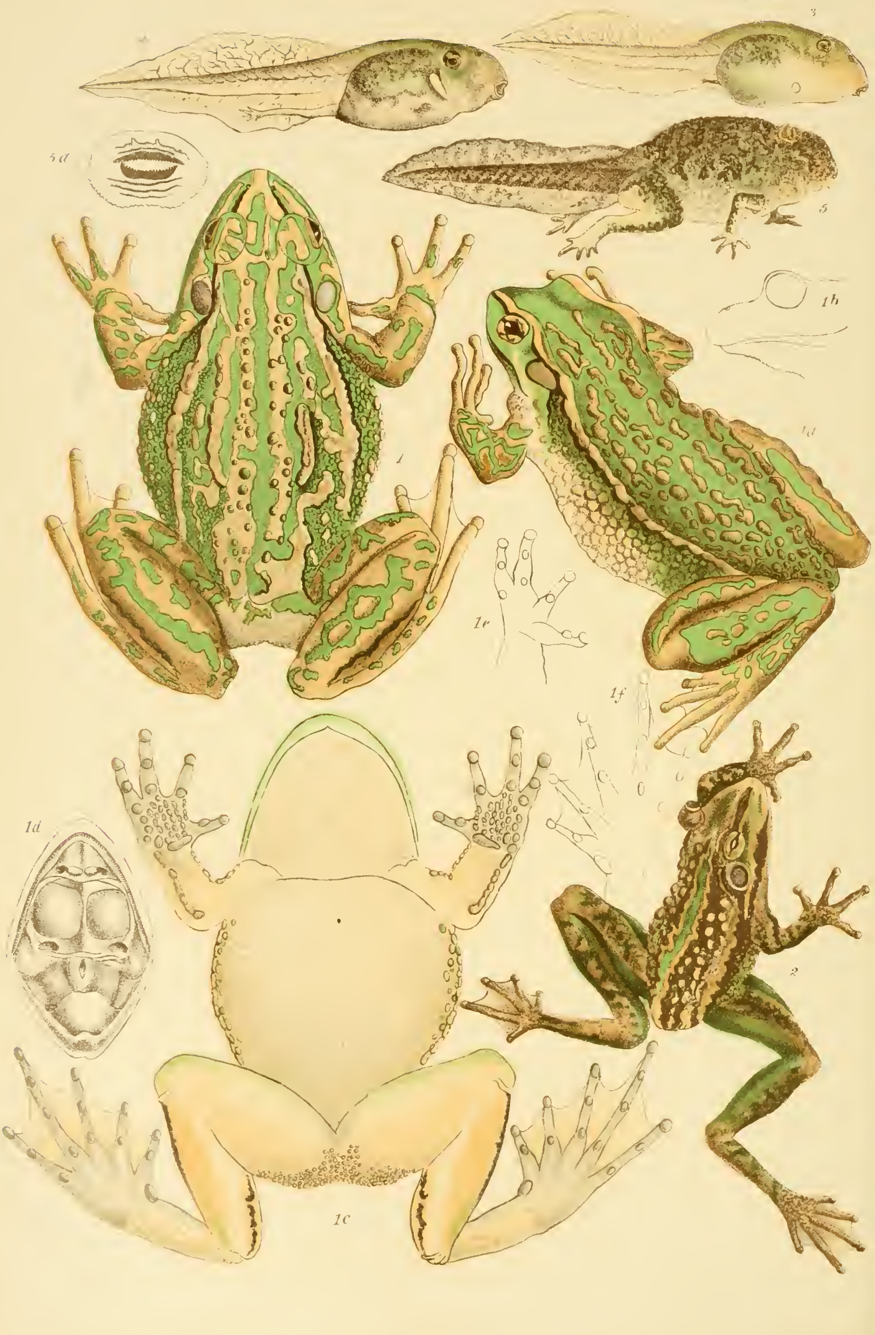

4
3
5a
5
1b
1
1a
1e
1f
1d
2
1c

PLATE 53.

RANOIDEA AUREA (LESS. SP.).

THE GREEN AND GOLDEN BELL-FROG.

[Genus RANOIDEA (TSCHUDI). (Sub-kingd. Vertebrata. Class Reptilia. Order Batrachia. Sub-ord. Anoura. Section Opisthoglossa. Fam. Hylidæ.)

Gen. Char.—Vomerine teeth forming two small groups between the inner nostrils. Tongue rounded, about one-third or less of its length free, very slightly notched behind. Ear-drum large, distinct. Eustachian tubes large; fingers and toes depressed, each terminated by a small oval disc, toes webbed, fingers not webbed. A subgular vocal sac in the male. Abdomen and under side of thighs glandulous; ends of transverse processes of sacral vertebræ not dilated. Australia.]

DESCRIPTION.—*Form:* body broad, ovate, depressed; head semielliptical, longer than broad, flattened above in front, concave between the very prominent eyes, which are less than the diameter of orbits apart; nostrils small, a little nearer the front edge of snout than edge of eye; ear-drum large, oval, nearly as long as the diameter of iris; about one-fifth of the length of the tongue free, very slightly notched behind. Legs stout, well developed; fingers with a slight membranous border, depressed, free from web; terminal discs small, suboval; a conspicuous glandular tubercle under each joint; 3rd finger longest, inner one shortest, swollen, and with a large transverse soft tubercle at base, palm of the hand crowded with coarse glandular tubercles; soles of hind feet smooth, toes slender, with small terminal discs, smaller than those of the fingers, and a smaller tubercle under each joint, a larger oblique tubercle at base of inner toe; webs extending to the terminal tubercles of all the toes except the 4th or longest one, which is only webbed to the penultimate joint; a narrow membranous ridge extends along the inner lower edge of the tarsus; sides, abdomen, under side of arms, tarsus, and hinder part of thighs on under side closely covered with small, crowded, glandular tubercles; front of head, cheeks, and midline of back smooth, about 4 irregular lines of large tubercles on each side of back, varying in size, shape, and disposition; a thick, tubercular, glandular ridge of a yellow color along each side of the body, extending from the middle of the snout over each eye and ear-drum, converging again at posterior end of body; smaller one from angle of mouth to shoulder. There are about 30 minute teeth in a single row on each side of upper jaw, and about 6 vomerine teeth in a little transverse group on each side, very slightly separated in the middle, and extending close to inner edge of the internal nostrils. *Color:* usually a brilliant verdigris- or pea-green above, and pearly-, purplish-, or brownish-white below; the soles of the feet and palms of the hands purplish-grey; hinder part of thighs and hind legs rusty-orange, with lighter glandular granules; a black streak extends from the nostril to the eye, and extending from behind the eye over the ear-drum, a variable way down the side, under the glandular yellow lateral streak, sending off a branch towards back of shoulder; above this constant black streak is an equally constant yellow one, the two lateral ones beginning at one point near middle of front edge of snout, diverging thence over the eye and extending along the sides of back, with thickened prominences, converging towards hind end of body; a similar yellow streak extends to angle of mouth, along upper lip, from about the vertical of the nostril; besides this lateral streak the rows of tubercles on the back are sometimes dark and sometimes golden-yellow (often with metallic golden-bronze lustre); the arms and legs mottled with irregular bands and patches of bluish-green and rusty-yellow. Hind part of the thighs and legs of a more bluish-green than the other parts of the body. Iris golden-bronze, with a black longitudinal streak on each side of the pupil; hands, feet, toes, and webs brownish golden-yellow.

Measurements of average specimen:—Length of head, 1 inch; greatest width, 1 inch 3 lines; depth, 7 lines; total length from tip of snout to posterior end of body, 3 inches 3 lines; greatest width of middle, 1 inch 8 lines; depth, 1 inch at middle; length, 1 inch 5 lines; leg, from knee to ankle, 1 inch 5 lines; from ankle to tip of longest or 4th toe, 2 inches 2 lines; length of inner or shortest toe, 5 lines; 2nd, 8 lines; 3rd, 1 inch; 4th, 1 inch 4 lines; 5th, 1 inch; length of arm from shoulder to elbow, 8 lines; from elbow to tip of 3rd or longest finger, 1 inch 5 lines; length of ear-drum, 3 lines; diameter of eye, 3½ lines.

Reference.— = *Rana aurea* (Less.), Voy. Coq. Zool., t. 7, f. 2 (1830); =*Ranoidea Jacksoniensis*, Tschudi, Mém. Soc. Sc. Nat. N., v. 2 (1838);=*Hyla Jacksoniensis*, Dum. & Bib. Erpt. gén., v. 8, p. 602 (1841).

This is one of the most beautifully colored Frogs known, but varies greatly; in early summer it is usually of the richest verdigris-, or pea-, green, with the rows of tubercles and spots and streaks of rich yellow, shining with bright golden-bronze metallic lustre in various parts. Other specimens agree with the above, but have a variable number of spots and streaks of dark-purple on the green of the back and sides; while some few are dark-brown or almost black on the head, back, and sides, where the green color is usually seen; and these often have the spots and streaks with a strong metallic lustre of golden-bronze, the green only seen on the thighs and legs, where it has a bluer hue than on other parts of the body. These extremes of bright-green and blackish-brown change one into the other at different times in one individual. For instance, the brown specimen, fig. 2 on our plate, turned green before the drawing was quite finished; and the beautiful green specimen, fig. 1*a*, escaped after the drawing was colored, and could not be found for some days, when, finding something soft under my foot, I picked up what I thought was an old brown kid glove, and found it was my sitter for the portrait, and put him again into his glass, where he died next day, first changing into his former vivid pea-green. In spring they are often entirely blackish above and white below, with bluish-green only on the thighs; and a specimen, entirely green above (tubercles and all), turned in a day to the uniform dark color above.

So completely like the common green edible Frog of Europe (*Rana viridis*) is this in form and habits, that I cannot agree with the majority of modern writers, who refer it to the genus *Hyla*, and I willingly adopt rather for it the genus *Ranoidea* of Tschudi, leaving it in the family *Hylidæ*. The discs at the tips of the fingers and toes are so much smaller than in *Hyla*, or the true Tree-Frogs, that they are almost useless for climbing, although they adhere tenaciously to the fingers when the living creature is held ; and this species, unlike the Tree-Frogs, is not found on trees or bushes, but in the neighborhood of water, ponds or pools of any kind, into which they, like the true Frogs (*Rana*), plunge on the least alarm, instead of shunning it as the Tree-Frogs (*Hyla*) do. The note of the male also approaches that of various true Frogs (*Rana*), and is quite unlike that of the Tree-Frogs (*Hyla*). The general sound is a hoarse, prolonged croak, varied by a loud "clunk" monotonously repeated at intervals, very much like the sound of the mallet and chisel of a number of stonemasons. So like is this that when a portion of the University was being built, and a number of masons were working on the hard sonorous basalt (called bluestone by the colonists) a hundred yards from my house, a newly arrived servant, writing home an account of the busy scene, mentioned that the masons could be heard at work the whole of the moonlight nights—so completely alike was the sound of these Bell-Frogs in an adjoining pond at night to the noise of the men by day. In summer the note often resembles so exactly the short "clunk" of the cattle-bells, that people seeking their cows or horses at dusk in the bush can scarcely tell one from the other.

The transverse processes of the sacral vertebræ are, as a rule, dilated at their ends in the *Hylæ*, but in the present Frog they are as narrow and nearly cylindrical as in the true Frogs (*Rana*); and it is curious that Dr. Günther, in describing the skeleton, does not notice this point. They keep on the margins of pools or under water during the day, but at night they wander about anywhere over the ground and gardens, seeking slugs, insects, worms, &c., for food. They are eaten by the natives, who, taking a torch by night, thrust a sharpened stick through as many of them as they choose to make a meal of, and using it like a spit, roast the collection to their taste ; and no doubt they are as good as the epicures in France find the *Rana viridis*.

A Greek scholar who had enjoyed at home the "ΒΑΤΡΑΧΟΙ" of Aristophanes, and noted the ludicrous exactness with which the author imitates the sound of the European Frogs' chorus in a marsh by his opening words of the chorus—

> "*βρεκεκεκἒξ κοὰξ κοάξ*
> *βρεκεκεκἒξ κοὰξ κοάξ*"

would fancy the Frogs of Greece had come out to bear him company, so accurately does the sound of the daily summer chorus of the present species in the like situation accord with that of the true *Rana* of Europe. The Australian youth, who might fancy that the coincidence was not so exact, from detecting a difference between the sound of the words as uttered in the schools and by the Frogs in the neighboring water, will find the discrepancy disappear, and at the same time the similarity of the European true Frogs and our representative, in this respect, vindicated by the following observation of Frere, in his translation of this play.* He begins the chorus with "*Brekeke-kesh*, *koash*, *koash*," and says in a preliminary note, " The spelling of the words of the chorus is accommodated to the actual pronunciation of the Frogs, which, it is presumed, has remained unaltered. The *B* in *Brekeke-kesh* is very soft, and assimilates to the *v*. The *e* in *kesh* is pronounced like ei in leisure, and the last syllable prolonged and accented with a higher tone. The word as commonly pronounced by scholars (with the ictus or English accent on the third syllable) bears no resemblance to the sound which it is meant to imitate ; which has, on the contrary, a slight ictus on the first syllable." This *V* sound of the *B*, or *β*, makes the wording of Aristophanes as exact an imitation of our present Frog as Frere makes it for the Greek one. I have been much amused in listening to the "Frösche Cantata" of the German composer Hennig, which is sometimes capitally sung by our Melbourne Liedertafel, in which the bass voice takes the part of a mature German Frog, giving the occasional loud croak of our species with all the additional exactness which a careful composer's music could add to the imitation. I fancy that difference of age of the individuals may account for some of the difference of the notes, and that not only the occasional very loud croak but also the metallic "bell" sound may only be uttered by old males.

---

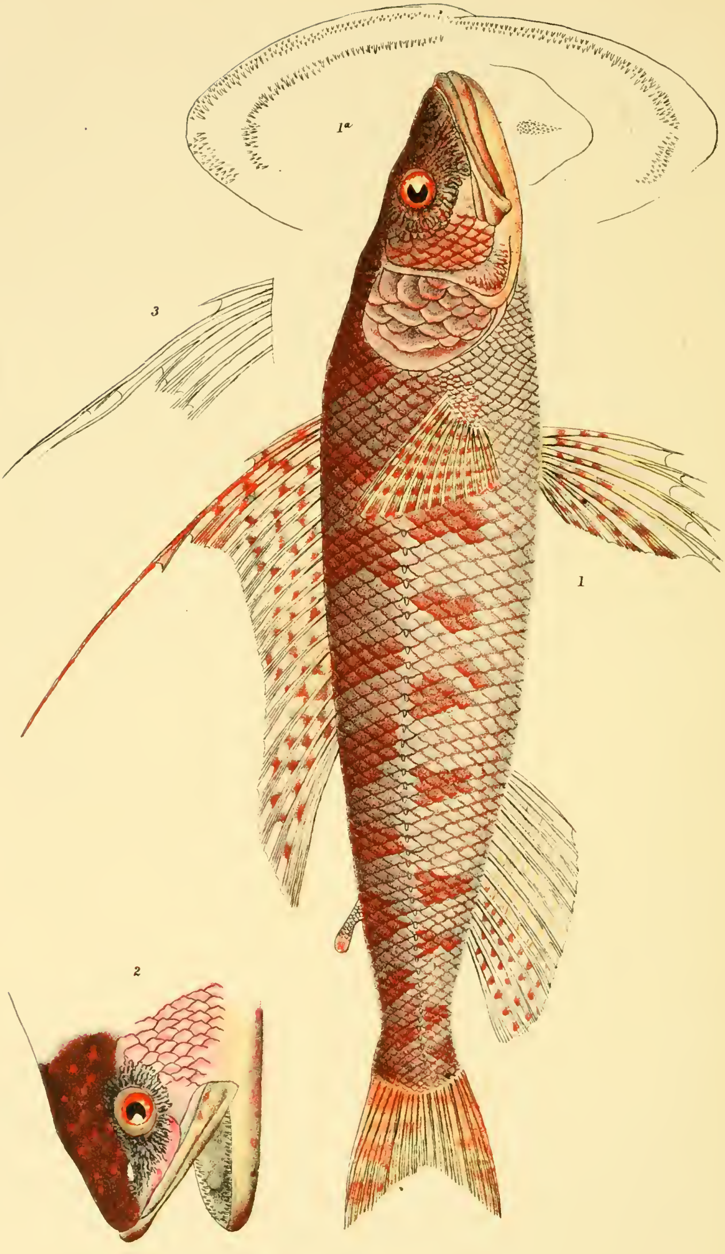
* The Works of the Right Honorable John Hookham Frere, edited by W. E. Frere, vol. 3, p. 249.

This species occurs in abundance over the whole colony, wherever stagnant water is to be found. It has not been figured of the correct colors of life before.

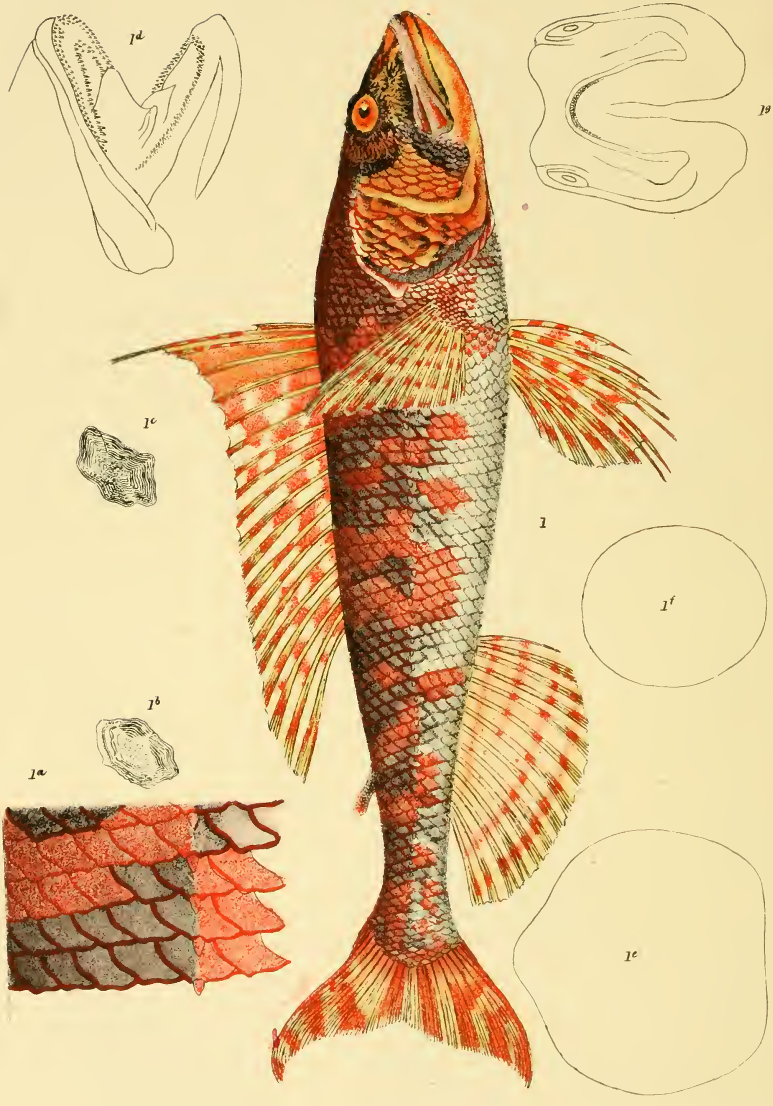
Explanation of Figures.

Plate 53.—Fig. 1, ordinary green specimen, viewed from above, natural size. Fig. 1*a*, one with fewer dorsal yellow tubercles viewed sideways (toes shortened by perspective). Fig. 1*b*, outline profile of head. Fig. 1*c*, same specimen as fig. 1, viewed from below. Fig. 1*d*, inside of mouth, showing two groups of vomerine teeth between the inner nostrils, also the Eustachian tubes and slightly notched tongue, natural size. Fig. 1*e*, underside of hand showing discs of fingers and swollen base of thumb, natural size. Fig. 1*f*, underside of foot, showing webs and discs of toes, natural size. Fig. 2, brown emaciated smaller specimen, natural size. Fig. 3, early stage of tadpole state, with gill opening, no front legs, and only slight trace of hind pair of legs, natural size. Fig. 4, more advanced stage of tadpole growth, with the hind limbs more developed, but still useless and not free, the anterior limbs not yet begun, natural size. Fig. 5, much more developed stage, with all four limbs well developed and capable of supporting the body, the tail beginning to shrivel, and the gill-openings closed as breathing by the lungs has commenced, natural size. Fig. 5*a*, front view of mouth of last specimen, natural size.

Frederick McCoy.



A. Bartholomew del et lith *Prof. McCoy direxit.* *Steam litho. Govt. Printing Office.*
)



A Bartholomew del et lith *Prof M^c Coy dirext* *Steam litho. Govt. Printing Office.*

Plates 54 and 55.

AULOPUS PURPURISATUS (Rich.).

The Australian Aulopus.

[Genus AULOPUS (Cuv.). (Sub-kingd. Vertebrata. Class Pisces. Sub-class Teleostei. Order Physostomi. Fam. Scopelidæ.)

Gen. Char.—Head and body moderately elongate, fusiform, slightly compressed; scales of moderate size; mouth deeply cleft, composed of the intermaxillaries; the maxillaries widely dilated behind; teeth small, in cardiform bands on the jaws, vomer, pharyngeal and pterygoid bones and tongue; eyes moderate; pectoral fins moderate; ventrals large (nine rays) just behind the pectorals, under the anterior dorsal ray; dorsal fin long, of fifteen or more rays, on middle of back; a small adipose dorsal fin between the dorsal and caudal; anal moderate; caudal forked: gill-opening very wide, branchiostegals numerous; pseudo-branchiæ well developed. Pyloric appendages few. Air bladder none.]

Description.—Female. *Form:* elongate, fusiform; depth of body in front of dorsal fin one-fifth the total length, excluding caudal fin; head about one-fourth of total length to tip of caudal, tetragonal, deeply hollowed between the eyes, rugose and slightly spinulose, cheeks nearly vertical, depressed towards snout, lower jaw a little longer than upper one; eye nearly seven times in length of head, and two and a half diameters from tip of snout. *Scales:* rounded, not ciliated, those on cheeks about as large as on anterior part of body, those on operculum much larger; about 55 (54 to 56) along lateral line, 5 to 7 above and 8 to 11 below under front of dorsal. *Fins:* dorsal rays, 20 or 21, first or simple spinous one, about two-thirds the length of ninth, which is shortest, the other rays branched and slightly increasing in length towards posterior end, where they exceed the interval to the adipose fin; caudal slightly forked, of about 20 rays, and a few short ones above and below; anal large, of 14 rays, the first ray simple and shortest; ventral large, of 9 rays, first four rays very thick, the first simple, the next three bifid and longest; the rest shorter and much branched; pectoral moderate, pointed, of 11 rays. *Color:* head and back purple, with the edge of the scales and a few spots on top of head vermilion, with a tinge of carmine, with several large irregular spots and transverse bands, two or three scales wide, of the same scarlet carmine red, with darker edges to the scales; the red patches do not reach the midline of the abdomen; below the lateral line the purple becomes lighter to pearly white on belly; ventral, dorsal, pectoral, and caudal fins yellowish, with transverse bands of crimson-red blotches; scaly adipose fin, purple below, yellow in middle, and red at tip; anal white with orange bands. *Teeth:* 3 rows in front and 2 behind on jaws; 2 rows of about 20 on palate bones; 6 or 8 on vomer, and a small patch on tongue. Branchiostegal rays, 14.

Reference.—Richardson, Icones Piscium, p. 6, t. 2, f. 3. = *A. Milesi*, Cuv. and Val., Hist. des Poiss., v. 22, p. 519, t. 650.

This magnificently colored Fish belongs to the restricted genus *Aulopus*, founded by Cuvier for a Mediterranean species, supposed to be a kind of Salmon by Bloch, who referred it to the genus *Salmo*, from its possessing the small adipose dorsal fin of all the

Salmonidæ. In Sydney it is popularly called the "Sergeant Baker." The males have much more elongate anterior rays to the dorsal fin and have much duller colors in less distinct patches, the top of the head brownish and rich dark-purple, fading gradually to whitish on belly; cheeks, operculum, and some round spots on top of head vermilion and carmine, and indistinct rosy blotches on sides; caudal purple, with 3 rows of reddish blotches; pectoral dark-grey with 3 or 4 transverse bands of darker spots; ventrals purplish with 3 rows in front and 5 rows behind of darker purple and lighter spots on the rays; anal light-grey, with 5 or 6 rows of lighter oblong spots in front, becoming darker purple behind; front of dorsal orange, hind part of dorsal grey with numerous darker blotches on the membranes of purple, front rays of dorsal red.

The hollowed top of the head and the character of the rays of the ventral fin, as well as the coloring, resembles the *Scorpænæ*, in which such simple large unarticulated rays occur in the pectoral. The extraordinarily large number of the branchiostegal rays separates it from the other families completely.

The first ray of the dorsal in both sexes is spinous, simple and shortest. The second ray bifid and longest, but only slightly exceeding the third and fourth much-branched rays in the female; while in the male the anterior filament is prolongued to a length about equalling the distance from its base to the adipose dorsal, while the posterior filament ends at little more than half its length; the first filament or branch of the third ray is rather less than half the length of the second ray.

The following are the detailed measurements of two of the specimens in the Museum :—

Measurements.	Male.		Female.	
	ins.	lines.	ins.	lines.
Length from snout to distal end of middle of caudal	21	3	18	0
" of caudal to middle	1	3	1	1
" of caudal to end of lobes	2	11?	3	2
" from snout to anterior edge of orbit	1	7	1	5
" of orbit	0	10	0	10
" of head from snout to end of operculum	5	1	5	0
" from snout to anal (measured along ventral edge)	13	0	11	9
" from front of anal to end of middle of caudal	8	3	6	6
" from snout to base of pectoral	5	6	5	0
" from snout to origin of 1st dorsal	6	9	6	0

Measurements—*continued.*

Measurements.	Male.		Female.	
	ins.	lines.	ins.	lines.
Length from snout to origin of small scaly 2nd adipose dorsal	16	0	14	0
„ from snout to origin of ventral fin...	6	3	6	0
„ of 1st dorsal	6	0	5	7
„ of pectoral	3	1	2	6
Height of (simple) ray of 1st dorsal	1	3	1	3
„ of 2nd (bifid) ray of 1st dorsal	*9	0	2	5
„ of 10th ray	2	1	1	9
„ of penultimate ray	3	4	2	3
„ of adipose dorsal	0	7	0	6
Length of anal...	3	0	2	5
Depth of anal (1st ray, simple)	1	7	1	4
Depth of anal (middle rays)	2	4	1	4
Length from base to tip of ventral fin (4th ray)	4	0	3	9
Width between eyes	1	1½	0	11½
Depth of body in front of ventral, about	3	10	3	6
Thickness of body in front of dorsal, about	3	10	3	3
Length of largest intermaxillary teeth	0	1	0	1
Scales 3 to 4 in 1 inch about middle of body at lateral line	...		...	

* Tip imperfect.

Rare in Hobson's Bay. The specimens in the Museum were caught in January, February, and June.

EXPLANATION OF FIGURES.

PLATE 54.—Fig. 1, male, one-third natural size. Fig. 1*a*, teeth on upper and lower jaws, palate bones, vomer, and tongue, natural size. Fig. 2, top of head of another specimen, to show the spotting, one-third natural size. Fig. 3, abnormal development of third ray of dorsal, from another specimen. PLATE 55.—Fig. 1, female, one-third natural size. Fig. 1*a*, scales of middle of body, natural size. Fig. 1*b*, scale from under adipose fin. Fig. 1*c*, scale from under third ray of dorsal fin. Fig. 1*d*, dentition, two-thirds natural size. Fig. 1*e*, section behind pectoral, half natural size. Fig. 1*f*, section in front of anal fin, half natural size. Fig. 1*g*, front view of head, one-half natural size.

FREDERICK McCOY.

MEMOIRS OF THE MUSEUM

ZOOLOGY OF VICTORIA
(Fishes.)

Pl.

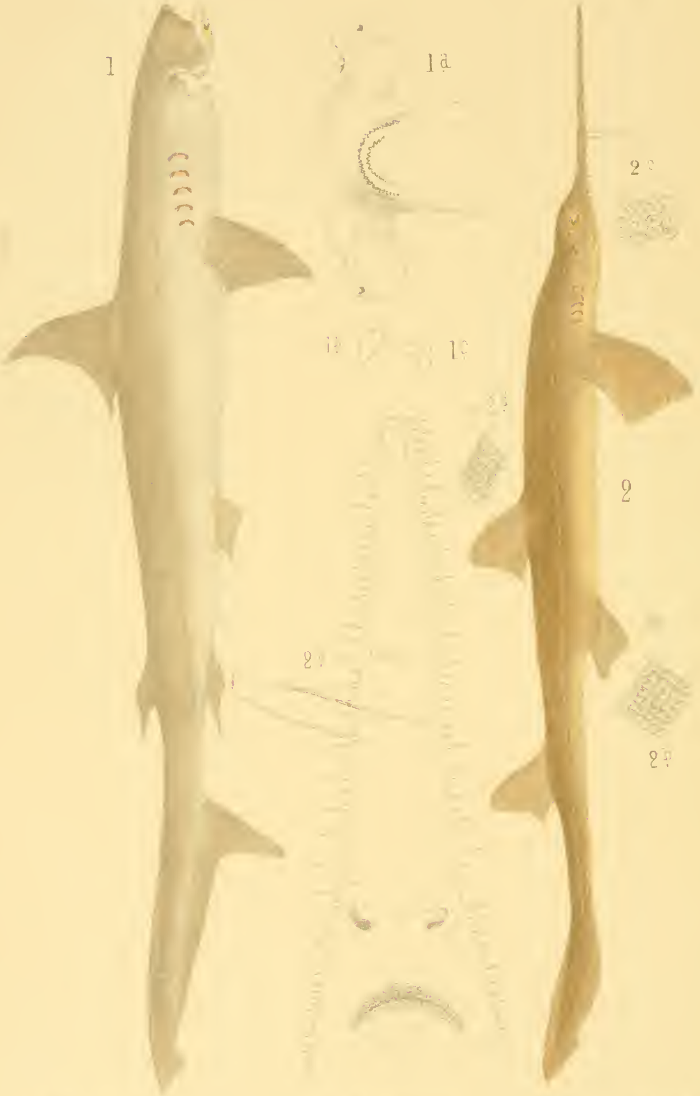


PLATE 56, FIG. 1.

ZYGÆNA MALLEUS (SHAW).

THE HAMMER-HEADED SHARK.

[Genus ZYGÆNA (CUV.). (Sub-kingd. Vertebrata. Class Pisces. Order Plagiostomata. Sub-ord. Selachoidea. Fam. Carchariidæ.)

Gen. Char.—Body fusiform, gradually tapering to end of tail; an anal and two dorsal fins; 1st dorsal fin without spines, opposite the space between the pectoral and ventral fins; caudal fin with a notch and a pit at its commencement; head broad, flattened, and elongate laterally with two oblong lobes, at the outer edge of which the eyes are placed, with a nictitating membrane. Nostrils on front edge of head; no spiracles; mouth semicircular, inferior; teeth of both jaws similar, oblique, with notch on outer side between pointed central cusp and base, smooth when young, serrated when old].

DESCRIPTION.—Ends of the transverse hammer-head nearly as wide as their posterior margins; nostrils near the eyes on anterior edge of head, prolonged in groove along greater part of front margin. *Color:* ashy brownish-grey above, whitish below; iris yellowish-white.

REFERENCE.—*Squalus zygæna* (Lin.), Syst. Nat., p. 399; *Zygæna malleus* (Shaw), Nat. Misc., t. 267.

Our Australian specimens of this most singularly shaped Shark are perfectly identical with those of the Mediterranean and English coast. The old Greek writers who describe the Fish named it *Zygæna* from the resemblance of the head to their balance, and they give the most exaggerated accounts of its ferocity. Oppian and Ælian refer to it as a source of danger to mariners, although curiously enough Pliny omits to mention it at all. The small size of the mouth and teeth prevents it really doing any very serious harm to large animals, and although active and fierce in habits "the monstrous balance-fish of ugly shape" is not very formidable.

The following are the dimensions of an averge sized specimen:—

Measurements.	ft.	ins.	lines.
Total length	5	8	0
Length from front to origin of dorsal	1	7	0
„ of base of dorsal	0	6	0
Height of dorsal	0	7	0
Length from front to anterior base of 2nd dorsal	3	7	6
„ of base of 2nd dorsal	0	1	9
Height of anterior part of 2nd dorsal	0	1	6
„ of posterior lobe	0	3	6
Length from anterior origin of base of caudal fin to tip	1	5	0
Depth of lower lobe of caudal	0	6	0

Measurements.	ft.	ins.	lines.
Length from front to origin of pectoral	1	1	0
„ of base of pectoral	0	3	3
„ of anterior margin of pectoral	0	7	6
„ from front to anterior base of ventral	2	6	6
„ of base of ventral	0	2	0
„ of anterior margin of ventral	0	2	3
„ of posterior margin of ventral	0	4	0
„ from front to anterior edge of base of anal fin	3	5	6
„ of base of anal	0	2	0
„ of anterior margin	0	2	6
„ of posterior margin	0	3	0
Width of head	1	5	6
Length of lateral ends	0	4	6
Width across posterior angles of mouth	0	5	6
„ of mouth	0	4	6
Length of largest teeth	0	0	3
Diameter of orbit	0	1	0
Length of middle gill-openings	0	2	0

Explanation of Figures.

Plate 56.—Fig. 1, lateral view, greatly reduced. Fig. 1*a*, underside of head to show proportion of lateral lobes and position of nostrils near eye on front edge. Fig. 1*b*, tooth of upper jaw, natural size. Fig. 1*c*, tooth of lower jaw, natural size.

Plate 56, Fig. 2.

PRISTIOPHORUS NUDIPINNIS (Günth.).

The Common Australian Saw-Fish.

[Genus PRISTIOPHORUS (Müll. and Henle). (Sub-kingd. Vertebrata. Class Pisces. Order Plagiostomata. Sub-ord. Selachoidea. Fam. Pristiophoridæ.)

Gen. Char.—Snout produced into a long, flat lamina, having a row of very unequal teeth projecting in one plane from the lateral edge. Body elongate, slender, fusiform; pectoral fins large, with free margins, much behind head; gill-openings lateral, in front of pectoral; spiracles wide, behind the eye. No nictitating membrane; nostrils inferior; a pair of long tentacles from underside of snout; teeth of mouth very small, in many close rows, with small cusp from broad base. Dorsal fins without spines, first in front of the ventrals, second behind them; no anal fin; caudal fin notched. Japan and Australia.]

Description.—Yellowish-brown, paler beneath; lateral teeth of snout very unequal, from 1 to 4 small ones irregularly between each pair of larger, a row of smaller, more equal teeth hooked backwards on the underside of the outer edge; nostrils considerably farther from first gill-opening than from tentacles; scales minute, nearly smooth, 3 or 5 slight ridges at base, the middle one faintly extended as a keel; 35 rows of teeth at edge of upper jaw.

Reference.—Günther, Cat. Fish. Brit. Mus. v. 8, p. 432.

The following are the dimensions of an average sized specimen :—

Measurements.	ft.	ins.	lines.
Length from tip of tail to end of saw	3	6	0
„ from tip of saw to mouth	0	9	0
„ from tip of saw to base of tentacles	0	5	3
„ of tentacles	0	2	6
„ from nostril to corner of mouth	0	2	0
Diameter of orbit	0	1	0
Length of spiracle	0	0	9
„ from tip of snout to front edge of orbit	0	8	0
„ from posterior edge of orbit to upper end of spiracle	0	0	3
„ from tip of snout to front edge of pectoral	1	1	0
„ to edge of 1st dorsal	1	7	0
„ to front edge of 2nd dorsal	2	4	9
„ of base of 1st dorsal	2	6	0
Greatest height	0	3	0
Length of base of 2nd dorsal	0	2	6
Height of 2nd dorsal	0	2	9
Length from tip of snout to front edge of ventrals	1	11	0
„ of base of ventrals	0	2	3
„ of front edge of ventrals	0	2	6
„ of posterior edge of ventrals	0	2	0
„ from hind base of tentacle to anterior edge of nostril	0	2	6
„ from anterior edge of nostril to anterior edge of anterior gill-opening	0	3	6

Teeth of mouth in 3 or 4 rows with broad oval base, and vertical, conical, central cusp about equalling the length of the base in height.

About 19 scales in a space of 3 lines about middle of body.

The ridging of the scales varies in different parts of the body ; very generally the margin is smooth, not reached by any of the ridges, the centre one is often longest, like a keel, and the other two, four or more at base, much shorter, but sometimes they are all nearly equally developed.

The naked, or scaleless, portion of the fins, from which the specific name is derived, varies in different individuals, and is not, I think, a true character, as most of my specimens have the dorsal and pectorals completely covered with scales, as in other Sharks. There is a narrow ridge on each side of the ventral surface of the tail from half-way between ventral and second dorsal converging to anterior margin of lower lobe of caudal fin.

This Saw-Fish is very common in Hobson's Bay, but it is now figured for the first time.

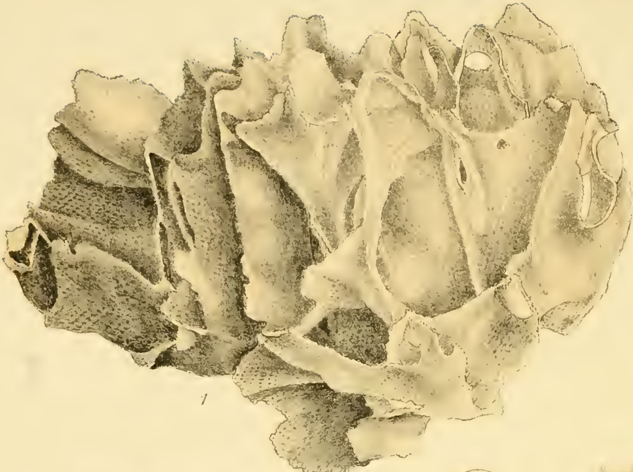
Explanation of Figures.

Plate 56.—Fig. 2, side view, greatly reduced. Fig. 2*a*, under view of snout, less reduced, to show the character of the lateral teeth, the crescentic mouth, and the relative position of the tentacles and nostrils. Fig. 2*b*, lower scales, natural size and magnified. Fig. 2*c*, teeth of jaw, magnified. Fig. 2*d*, upper scales, natural size and magnified.

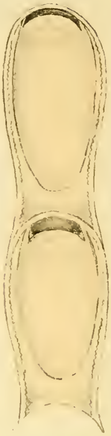
Frederick McCoy.

Biflustra

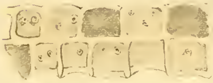
(Polyzoa)



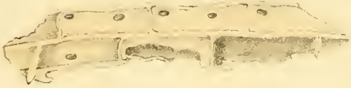
1



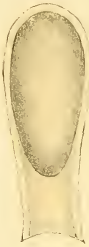
1c



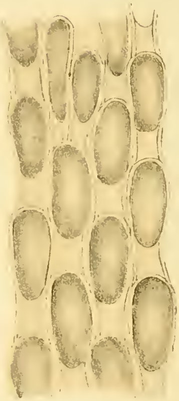
1e



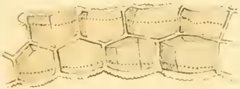
1d



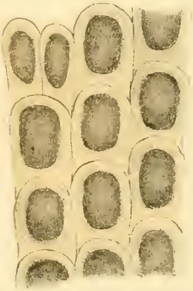
1b



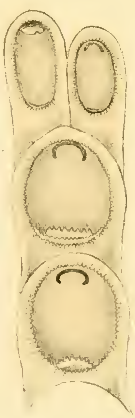
1a



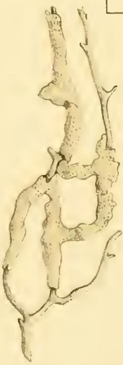
2a



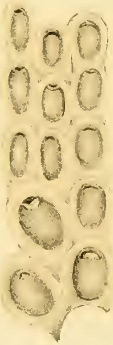
2



3b



3



3a

J Ripper del
A.Bartholomew lith
Prof McCoy direx^t
Steam litho, Govt, Printing Office

PLATE 57, FIG. 1.

BIFLUSTRA PERFRAGILIS (P. MACGIL.).

[Genus BIFLUSTRA (D'ORBIGNY). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-ord. Cheilostomata. Fam. Membraniporidæ.)

Gen. Char.—Polyzoary usually consisting of two layers of horizontal cells placed back to back and easily separable, occasionally of a single adnate layer ; cells large, more or less quadrate, with rigid raised margins, and the front partly occupied by a broad, usually granular lamina.]

DESCRIPTION.—Cells much elongated, slightly arched above, raised margins minutely granular ; the lamina smooth or finely granular, occupying about the lower third of the front of the cell, and extending as a narrow rim a short distance up the sides, leaving an oval or elliptical aperture.

REFERENCE.—*B. fragilis*, P. H. MacGillivray, Trans. Roy. Soc. Vict., 1868.

King's Island, Bass's Straits ; Port Phillip Heads.

This species is usually found in two layers of cells, the resulting lamina being variously twisted and united so as to form an extremely delicate cavernous polyzoary. This double arrangement is, however, not constant, and I have a specimen of *Eschara mucronata* on the surface of which a single layer has extended from a mass of the ordinary double form. The cells are elongated, usually about three times as long as broad ; the raised margins and lamina are nearly smooth or very finely granular. In some specimens, however, the cells are shorter, the ridges and lamina stronger, and the granulations coarser, approximating to the structure in the next species.

EXPLANATION OF FIGURES.

PLATE 57.—Fig. 1, specimen, natural size. Fig. 1*a*, portion, magnified. Fig. 1*b*, single cell from same specimen, more highly magnified. Fig. 1*c*, two cells from another specimen, with the membrane filling the aperture entire, and showing the mouth at the upper part. Fig. 1*d*, section, showing the sides of the cells. Fig. 1*e*, section, showing the ends of the cells.

---

* In different descriptions "zoarium" is used for "polyzoary," "zoœcium" is used for "cell," and "oœcium" is used instead of "ovicell."

PLATE 57, FIG. 2.

BIFLUSTRA DELICATULA (BUSK).

DESCRIPTION.—Cells quadrate, usually not more than twice as long as broad; margin very thick and regularly granular or tubercular; lamina thick, granular on the surface and edges, leaving a broadly elliptical aperture.

REFERENCE.—Busk, Crag Polyzoa, p. 72, pl. i., fig. 1.

Queenscliff.

Like the last, *B. delicatula* usually occurs in two layers, forming a cavernous mass; and of this condition I have fine specimens from Port Curtis, in Queensland. The cells are broader than in *B. fragilis;* the septa and lamina much thicker and more strongly granular; the markings extending almost as short transverse ridges. The only Victorian specimen I have seen occurs in a *Membranipora* form as a single layer creeping over a narrow seaweed. In it the cells are much smaller, but do not otherwise differ from those of the Port Curtis specimens. The serrated denticle at the bottom of the aperture exists only in two or three of the cells of the Queenscliff specimen, and is altogether absent in those from Queensland, but, with that exception, they agree precisely with Busk's description and figure.

EXPLANATION OF FIGURES.

PLATE 57.—Fig. 2, portion, magnified, of a specimen from Port Curtis, in which the cells were arranged in a double layer, the polyzoary being twisted and cavernous as in fig. 1. Fig. 2*a*, end view of cells from the same specimen, showing the dovetailed arrangement which frequently, but not always, exists in this species. Fig. 3, specimen occurring in a single layer, encrusting a narrow seaweed. Fig. 3*a*, portion of the same specimen, magnified to the same extent as fig. 2. Fig. 3*b*, a small group of cells from the same, more highly magnified; the two large cells show the broad serrated denticle at the bottom of the aperture.

The genus *Biflustra* was proposed by D'Orbigny for a large number of forms, mostly fossil, characterised by having cells similar to those of *Membranipora*, but disposed in two layers placed back to back and easily separable. All the species figured in the

Paléontologie Française are either subcylindrical or compressed and ramose. In the Crag Polyzoa, Busk adopts the genus and describes and figures *B. delicatula* from fossil specimens from the Crag, and recent ones from Australia. I believe the genus to be a good one, excluding, however, many forms referred to it by D'Orbigny. Lamarck's *Eschara chartacea* is probably one or both of the species here described.

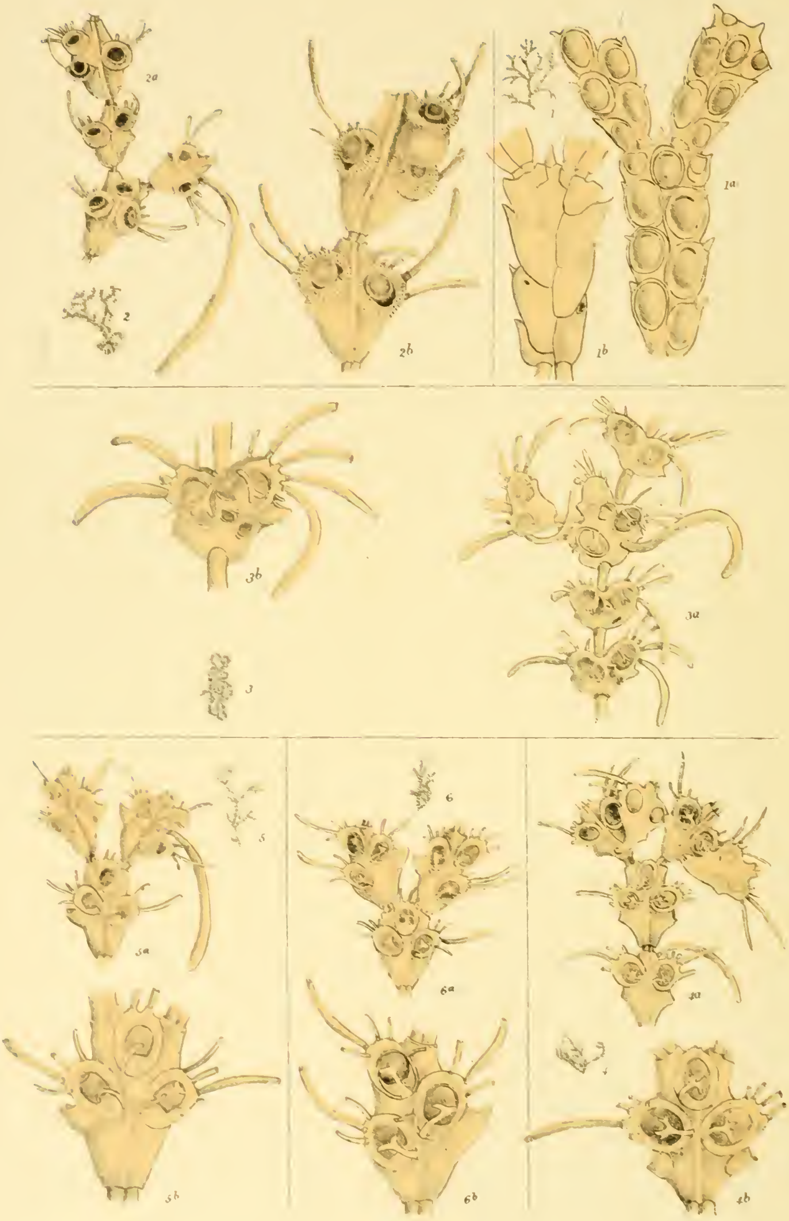
The specimens and descriptions of the above species are from Mr. MacGillivray.

FREDERICK McCOY.

Pl. 58

ZOOLOGY OF VICTORIA

(Polyzoa)



J. Rover del.
A. Bartholomew lith.
Prof. McCoy direx.
Steam litho Govt. Printing Office

PLATE 58, FIG. 1.

CELLULARIA CUSPIDATA (BUSK).

[Genus CELLULARIA (PALLAS). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-ord. Cheilostomata. Fam. Cellulariidæ.)

Gen. Char.—Cells bi-triserial, oblong or rhomboidal, contiguous, usually perforated behind. Without avicularia or vibracula.]

DESCRIPTION.—Cells oblong; aperture with the margin thickened and nearly smooth; outer angle of the cells and the summit of the median cell at a bifurcation, produced into a short sharp spine. A single perforation behind.

REFERENCE.—Busk, Brit. Mus. Cat. Mar. Polyzoa, p. 19, pl. xxvii., figs. 1, 2.

Queenscliff and other places; common.

Forms whitish, curling tufts, from $\frac{1}{2}$ inch high upwards, attached to algæ and zoophytes. It is at once distinguished by the pointed process on the upper and outer angle of the cells and by the similar strong cusp on the summit of the median cell at a bifurcation. In old or worn specimens the single posterior perforation cannot usually be distinguished. I have not seen the ovicell, but according to Busk it is smooth.

EXPLANATION OF FIGURES.

PLATE 58.—Fig. 1, specimen, natural size. Fig. 1*a*, front view of the same, magnified. Fig. 1*b*, view of back, magnified; in two cells the posterior perforation is shown.

PLATE 58, FIG. 2.

MENIPEA CRYSTALLINA (GRAY SP.).

[Genus MENIPEA (LAMX.). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-ord. Cheilostomata. Fam. Cellulariidæ.)

Gen. Char.—Cells oblong, abbreviated or elongated and narrowed downwards; imperforate behind; a sessile lateral avicularium (frequently absent) and one or two sessile avicularia (also frequently absent) on the front of the cell. Ovicell globular, immersed in the internode.]

---

* In different descriptions "zoarium" is used for "polyzoary," "zoœcium" is used for "cell," and "oœcium" is used instead of "ovicell."

DESCRIPTION.—A pair of cells in an internode, with three at a bifurcation; connecting tubes short and double; aperture nearly circular, largely filled in by a tubercular calcareous plate, usually broader below and leaving a subtriangular opening; 3 or 4 long slender spines articulated to the upper and outer margin of the aperture. Avicularium, when present, with the mandible opposite the calcareous plate filling in the lower part of the aperture. Ovicell deeply immersed.

REFERENCE.—Gray, Dieffenbach, New Zealand, ii. 293; Busk, Brit. Mus. Cat. Mar. Pol., p. 28, pl. xl.

Queenscliff and other places.

Forms small curling tufts attached to algæ and polyzoa. The avicularia are frequently wanting in all the cells of a specimen. When present they are small and situated so that the mandible opens opposite the lower edge of the aperture. When ovicells are present there are three cells in an internode, the ovicell being globular and deeply immersed in the upper cell, which is situated to one side and not mesially, as in the tricellular internode of a bifurcation. In this species, as in *M. cervicornis*, in addition to the usual bifurcating branches, one occasionally springs from the front of a cell.

EXPLANATION OF FIGURES.

PLATE 58.—Fig. 2, specimen, natural size. Fig. 2*a*, portion, magnified. Fig. 2*b*, two internodes, more highly magnified; a deeply immersed ovicell is shown in the upper cell of the upper internode, and the lateral avicularium is seen in the left-hand cell of the lower.

I follow Wyville Thomson, whose generic character I have given, in uniting *Emma* with *Menipea* as I cannot see that there is any sufficient distinction between the two genera. *Emma* is distinguished from *Menipea* by the aperture being contracted by a more or less granular plate, and by the lateral avicularia being situated below the level of the opening. All the species here described certainly belong to the same genus. In *M. cyathus* the granular plate is replaced by a slightly thickened rim, occasionally wider at the lower part; and the situation of the avicularium varies from opening opposite the upper third, as in *M. Buskii*, to opposite the lower edge of the aperture, as in *M. crystallina*.

PLATE 58, FIG. 3.

MENIPEA CYATHUS (WYV. THOMSON).

DESCRIPTION.—A pair of cells in an internode, with three at a bifurcation; connecting tube single; aperture of cell oval, oblique; 3 to 6 long spines, several of which are pod-like, articulated to the upper and outer margin; opercular spine springing from the upper and inner margin of the aperture and pointed downwards, divided into two or more processes. Avicularium opening opposite the upper third of the opening.

REFERENCE.—Wyville Thomson, Dublin Natural History Review, vol. v. (1858), p. 143, pl. xv., figs. 10, 10*a*.

Queenscliff.

M. cyathus differs from the other species here described in the connecting tubes being long and single. The cells project considerably; the aperture is oval or elliptical; the calcareous plate is reduced to a simple marginal ring. From the upper cell there are usually 6 spines and from the lower 4, but the number is not constant. Several are usually very large and pod-like. The opercular spine is directed downwards and outwards from the upper and inner part of the margin; in the upper of the two cells of an ordinary internode and in the median one at a bifurcation it is usually simply bifid, and in the others each branch generally again divides so as to form four points. The avicularium is of considerable size, and opens opposite the junction of the middle and upper thirds of the aperture. Besides the lateral avicularia there is occasionally a sessile avicularium in front between the cell apertures. In the lower part of the front of the upper of two cells of an internode, there is constantly a round mark with an annular margin from which a radicle tube occasionally springs.

EXPLANATION OF FIGURES.

PLATE 58.—Fig. 3, specimen, natural size. Fig. 3*a*, small portion, magnified; small sessile avicularia are shown on the front of three of the internodes, and in the internode of bifurcation a radicle tube is also seen. Fig. 3*b*, single internode, more highly magnified; in addition to the constant round mark there is in this specimen another similar mark immediately below the anterior sessile avicularium.

PLATE 58, FIG. 4.

MENIPEA CERVICORNIS (P. MACGIL.).

DESCRIPTION.—A pair of cells in an internode, with three at a bifurcation; connecting tubes double; aperture oblique, partly filled in by a faintly granular calcareous plate; 4 to 6 hollow spines, of which several are generally larger and pod-like, articulated to the outer margin. Opercular spine springing from the inner and lower part of the aperture, enlarged and branched at the extremity. Avicularia large, opening nearly opposite the lower edge of the aperture.

REFERENCE.—*Emma cervicornis*, P. H. MacGillivray, Trans. Roy. Soc. Vict., 1868.

Queenscliff.

The branched opercular spine, springing from the inner and lower part of the aperture, readily distinguishes this from the other two-celled species. In addition to the branches of bifurcation others frequently rise from the front of a cell, usually the lower in an internode. The openings of these face the cells from which they rise.

EXPLANATION OF FIGURES.

PLATE 58.—Fig. 4, specimen, natural size. Fig. 4*a*, portion, magnified, showing, in addition to the details of the cells, also two branches originating from the front of the upper internodes. Fig. 4*b*, three-celled internode at a bifurcation, more highly magnified.

PLATE 58, FIG. 5.

MENIPEA TRICELLATA (BUSK).

DESCRIPTION.—Cells three in an internode, narrowed downwards, elongated; connecting tubes short and double; aperture small, with a granular thickened margin; 4 or 5 long slender spines articulated to the upper and outer margin; opercular spine simple, springing from the inner margin. Avicularia opening nearly opposite the lower edge or middle of the aperture.

REFERENCE.—Busk, Voy. *Rattlesnake*, i., 373; Brit. Mus. Cat. Mar. Polyz., p. 28, pl. xli.

Queenscliff.

This species is easily distinguished from *M. Buskii* by the simple opercular spine, as well as by the cells being much more elongated and narrow. The avicularia are frequently absent.

EXPLANATION OF FIGURES.

PLATE 58.—Fig. 5, specimen, natural size. Fig. 5*a*, portion, magnified. Fig. 5*b*, internode (of bifurcation), more highly magnified.

PLATE 58, FIG. 6.

MENIPEA BUSKII (WYV. THOMSON).

DESCRIPTION.—Cells three in an internode; connecting tubes short and double; cells short and wide; aperture round, with a thickened, granular, calcareous margin, straightened below; usually 4 spines at the upper margin, of which the second or second and third from the outer edge are much larger and thicker, and there is frequently another smaller one on the inside. Opercular spine attached to the inner and lower part of the aperture, clavate. Avicularium opening opposite the middle or upper third of the aperture.

REFERENCE.—Wyville Thomson, Dublin Nat. Hist. Review, vol. v., p. 144, plate xii., fig. 1.

Queenscliff.

Forms small tufts adhering to algæ and zoophytes. Readily distinguished by the three cells in an internode and the peculiar clavate opercular spine. I have not seen ovicells, but they are described by Thomson as being " spherical, with a richly granular surface, imbedded among the cells, on the cavity of two of which it encroaches.

EXPLANATION OF FIGURES.

PLATE 58.—Fig. 6, specimen, natural size. Fig. 6*a*, portion, magnified. Fig. 6*b*, internode, more highly magnified.

I am indebted to Mr. MacGillivray for the specimens and descriptions illustrated by this plate.

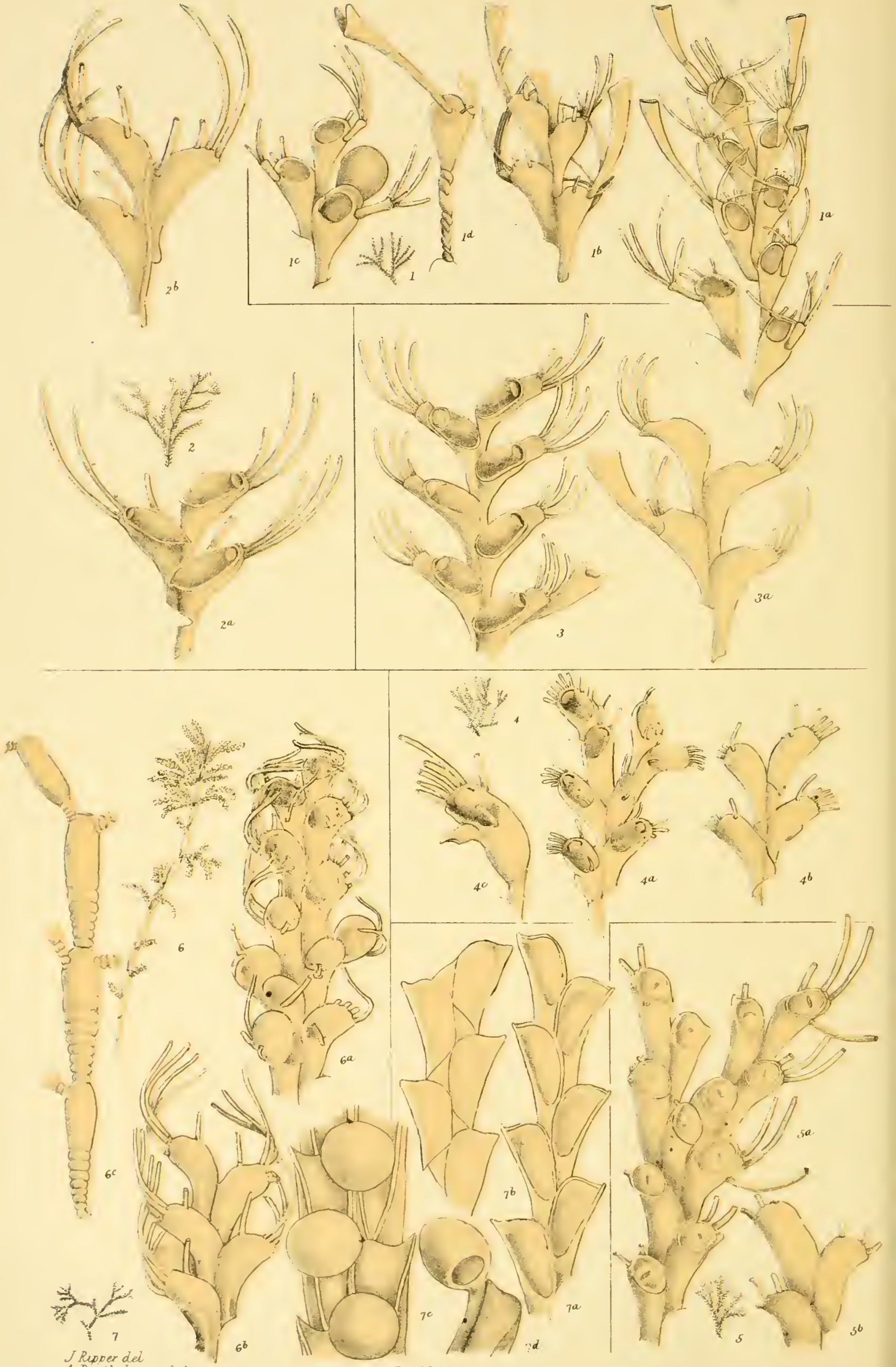
FREDERICK McCOY.

Buchanan
Stephanian
Bugula

Pl. 59

ZOOLOGY OF VICTORIA

(Polyzoa)



J Ripper del
A. Bartholomew lith

Prof Mc Coy direxᵗ

Steam litho. Govt. Printing Office.

PLATE 59, FIG. 1.

BICELLARIA TUBA (BUSK).

[Genus BICELLARIA (BLAINVILLE). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-ord. Cheilostomata. Fam. Bicellariidæ.)

Gen. Char.—Branches continuously celluliferous; cells biserial, turbinate, more or less free above, aperture directed upwards and forwards, with several marginal or submarginal spines.]

DESCRIPTION.—Cells elongated, considerably narrowed downwards; aperture nearly round, looking obliquely upwards and forwards; 3 or 4 long submarginal spines, and one short thick process at the anterior and outer part, with 3–6 long spines articulated to its summit. Avicularium very long and trumpet-shaped, with a minute mandible on the summit. Ovicell globular, placed at the summit of a cell.

REFERENCE.—Busk, Voy. Ratt., i., 373; Cat. Mar. Pol. Brit. Mus., p. 42, pl. xxxi.

Queenscliff; Western Port; Portland, Mr. Maplestone.

This species forms large, handsome dense tufts, sometimes 5 or 6 inches high. It is usually of a delicate pink color, but sometimes of a silvery grey; the cells in the latter being rather smaller and more slender, but not otherwise differing. It is readily distinguished by the peculiar thick process, springing from below and behind the anterior and outer part of the margin, to the outer extremity of which 3–5 long processes are articulated. The avicularia are very peculiar. They are trumpet-shaped, very narrow, considerably longer than the cells, to the back of which, a little below the margin, they are articulated; a minute mandible is situated in a transverse cup-shaped hollow on the summit. One of the spines is frequently lower down the back than the others. A branch sometimes rises by a spirally twisted stem.

EXPLANATION OF FIGURES.

PLATE 59.—Fig. 1, fragment, natural size. Fig. 1*a*, front view, magnified, showing the thick process with its digitiform spines and several long trumpet-shaped avicularia. Fig. 1*b*, back of portion of same. Fig. 1*c*, ovicell. Fig. 1*d*, portion of a branch originating by a spirally twisted stem; shows also an avicularium with its small mandible.

---

* In different descriptions "zoarium" is used for "polyzoary," "zoœcium" is used for "cell," and "oœcium" is used instead of "ovicell."

Plate 59, Figs. 2 and 3.

BICELLARIA GRANDIS (Busk).

Description.—Cells large, much expanded above, spreading outwards, with a large nearly horizontal aperture. A variable number of spines from the outer edge.

Reference.—Busk, Voy. Ratt., i., 374; Cat. Mar. Pol. Brit. Mus., p. 42, pl. xliv.

Queenscliff; Cape Otway, Mr. J. Payter.

B. grandis differs from the other species in the large size of the cells, in their being very narrow below and expanded widely above, and in the large, nearly horizontal, elliptical opening. There are two marked varieties. In the one there are several spines rising separately immediately behind and below the aperture, some of which occasionally originate together from a wide prolongation of the cell. In this form there is constantly a separate spine about half-way down the back of the cell. The aperture is frequently pointed at its inner end. I have not seen the avicularia. This is the form described and figured by Busk. In the other, the cell is prolonged immediately below the outer margin into a broad process, to the end of which all the spines are attached. There is no posterior spine. The avicularia are similar to those of *B. tuba*, but are shorter and stouter. I was at first inclined to consider them as distinct species, but as in the first variety the spines frequently spring from a production of the outer part of the cell, and in our ignorance of the structure of the avicularia the only constant difference is in the presence of the posterior spine, I think it is better, for the present at least, to unite them. The second form may be called var. *producta*.

Explanation of Figures.

Plate 59.—Fig. 2, fragment, natural size. Fig. 2*a*, portion of typical form, magnified. Fig. 2*b*, back of same, showing the posterior spines. Fig. 3, front view of portion of var. *producta*, magnified, showing the broad spiniferous extension of the cell and an avicularium. Fig. 3*a*, back of the same.

PLATE 59, FIG. 4.

BICELLARIA CILIATA (LINN.).

DESCRIPTION.—Cells very small; outer margin with about 6 long slender spines; a small spine on the front of the cell immediately below the aperture, and another a short distance down the back. Avicularia small, capitate, attached to the outer part of a cell. Ovicells small, round, on the inner margin of the aperture.

REFERENCE.—Busk, Cat. Mar. Pol. Brit. Mus., p. 41, pl. xxxiv.

Queenscliff; Portland, Mr. Maplestone.

Of the form now described I have only seen two or three small fragments; in all of them the spine in front is simple, and I can see no difference between it and the European *B. ciliata.* Busk's *B. gracilis* differs in the form of the cells, and in the presence of a fine double spine in front. I had specimens with a double spine which I referred to it, but they have unfortunately been lost, and I have no description or figure.

EXPLANATION OF FIGURES.

PLATE 59.—Fig. 4, specimen, natural size. Fig. 4*a*, front view, magnified. Fig. 4*b*, back of same. Fig. 4*c*, a single cell, more highly magnified, showing a small capitate avicularium.

PLATE 59, FIG. 5.

BICELLARIA TURBINATA (P. MACGIL.).

DESCRIPTION.—Cells turbinate, elongated, much contracted below, upper part scarcely free; aperture nearly circular, with 3 or 4 long submarginal spines from the upper and outer margin.

REFERENCE.—P. H. MacGillivray, Trans. Roy. Soc. Vict., 1869.

Queenscliff.

Of this species, I have only a single tuft. It is quite distinct, and easily recognisable by the long, slightly expanded, turbinate cells, the nearly circular aperture, and the 3 or 4 submarginal spines.

EXPLANATION OF FIGURES.

PLATE 59.—Fig. 5, portion, natural size. Fig. 5*a*, front view, magnified. Fig. 5*b*, back view.

PLATE 59, FIG. 6.

STIRPARIA ANNULATA (MAPLESTONE).

[Genus STIRPARIA (GOLDSTEIN). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-ord. Cheilostomata. Fam. Bicellariidæ.)

Gen. Char.—Celluliferous branches attached in regular tufts to a bare, annulated, corneous common stem. Cells biserial, turbinate, aperture looking upwards and forwards and with marginal spines.]

DESCRIPTION.—This species forms beautiful tufts about three inches high. Each branch is formed of a soft corneous stem, narrowed at intervals of about an eighth of an inch. The narrow parts are regularly and distinctly annulated, but not articulated ; the annulations extend, especially in the older portions, to a greater or less extent on the swollen fusiform parts, more prominently at their bases. The lower parts of the stems have no cell-bearing branches. These are attached regularly, one on each side at the summit of a spindle-shaped portion, by a short annulated stem, which swells at the top and bifurcates, the divisions again rapidly bifurcating, so as to form beautiful fan-shaped tufts. The cells are turbinate. The aperture is large, opening upwards and forwards. There are usually 4 very long, incurved spines articulated closely together to the outer edge, a separate spine from the inner part of the aperture passing behind the cell above, and another separate spine on the front of the cell below the aperture. The cells are distinct behind, and each has a peculiar bifurcate mark on the back. The ovicells are cucullate, attached to the outer edge of the margin of the aperture.

REFERENCE.—*Bicellaria annulata,* Maplestone, Journ. Microp. Soc. Vict. 1879.

Cape Otway, Mrs. George Caldwell ; Portland, Mr. Maplestone.

EXPLANATION OF FIGURES.

PLATE 59.—Fig. 6, branch, natural size. Fig. 6*a*, front view, magnified, showing the arrangement of the spines and ovicells. Fig. 6*b*, back view, showing the peculiar bifurcate mark. Fig. 6*c*, portion of the common stem, magnified.

PLATE 59, FIG. 7.

BUGULA NERITINA (LINN.).

[Genus BUGULA (OKEN). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-ord. Cheilostomata. Fam. Bicellariidæ.)
Gen. Char.—Cells bi-multiserial, closely contiguous, aperture very large, directed forwards, the margins not at all or very slightly thickened.]

DESCRIPTION.—Cells biserial, elongated, upper edge straight, with the angles projecting; aperture large, occupying nearly the whole front. No avicularia. Ovicells large, situated at the upper and inner angles of the cells.

REFERENCE.—Busk, Cat. Mar. Polyz. Brit. Mus., p. 44, pl. xliii.

Hobson's Bay; Queenscliff; Warrnambool, Mr. Watts.

Bugula neritina is readily distinguished from the other Victorian species. It forms small tufts of a brownish color. The cells are straight above, each angle projecting as a short spine; the aperture is very large, the margin very slightly thickened. I have never seen avicularia. The ovicells are large, rounded, situated at the upper and inner angles of the cells. They are pearly white (in dried specimens) and are very conspicuous against the brown of the rest of the polyzoary.

EXPLANATION OF FIGURES.

PLATE 59.—Fig. 7, portion, natural size. Fig. 7*a*, cells, magnified, front view. Fig. 7*b*, cells magnified, back view. Fig. 7*c*, small portion to shew ovicells, magnified. Fig. 7*d*, single cell, viewed from the outside, showing attachment and opening of an ovicell.

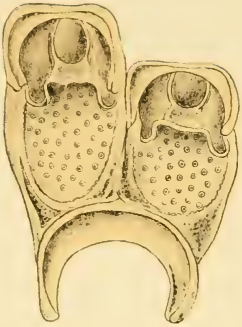
The specimens and descriptions of the above *Bicellariidæ* were presented by Mr. MacGillivray.

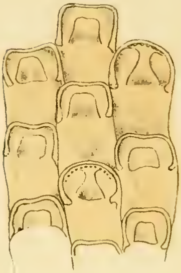
FREDERICK MCCOY.

— 60

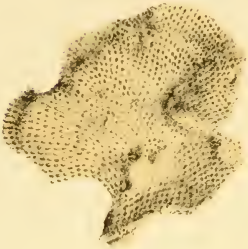
Steganoporella
Petralia

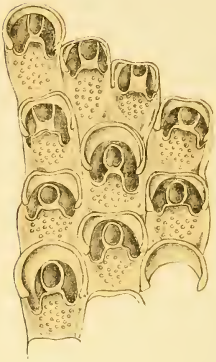
(Polyzoa)

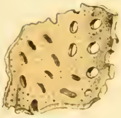

1c

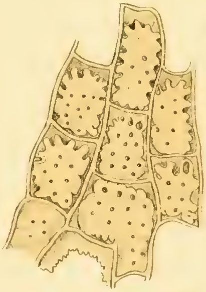

1a

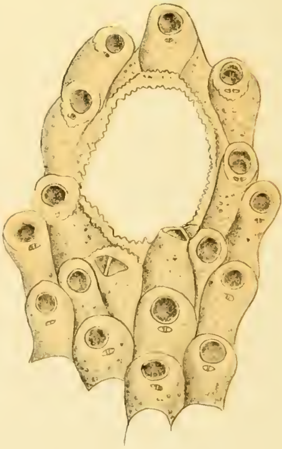
0 .01 1

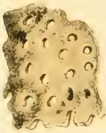

1

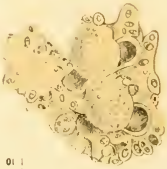

1b

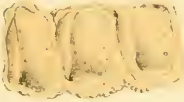

2


2c


3b


2a


2d


2e

0 01 1

P H Mac Gillivray del
A Bartholomew lith

Prof M^{c}Coy direx^{t}

Steam litho, Govt Printing Office

PLATE 60, FIG. 1.

STEGANOPORELLA MAGNILABRIS (BUSK SP.).

[Genus STEGANOPORELLA (SMITT). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-ord. Cheilostomata. Fam. Steganoporellidæ.)

Gen. Char.—Polyzoary expanded, formed of a single layer of cells, or of two united back to back; cells with calcareous raised margins; a membranous layer stretched across the front of each cell and separated from the receding calcareous layer, so as to leave a space or chamber between the two; operculum of outer wall very large, orifice of inner nearly circular.]

DESCRIPTION.—Polyzoary rigid, expanded, usually sub-erect; cells quadrate, arranged in linear and alternate series, in a single layer or in two placed back to back; margins raised, calcareous. A separate membranous layer, stretched tightly across the front of the cell; operculum very large, attached on each side to a projecting process of the cell-margin and strengthened by a narrow corneous band. Inner wall a calcareous, punctured lamina, extending forwards and downwards so as to leave a chamber between it and the outer membrane; it opens by a nearly circular mouth, with projecting margin, behind which a broad square plate, with the sides turned down and united to the lamina, rises to the articulating base of the operculum.

REFERENCE.—*Membranipora magnilabris*, Busk, Cat. Mar. Pol. Brit. Mus., p. 62, pl. lxv., fig. 4 = *Steganoporella elegans*, Smitt, Floridan Polyzoa, Part ii., p. 15, pl. iv., figs. 96–101.

Portland, attached to piles, Mr. Maplestone; Queenscliff.

I have only seen dried specimens of this very peculiar species, the structure of which it is to be hoped will ere long be examined in the living state. It seems to be identical with Smitt's *S. elegans* described from the Gulf of Florida, and no doubt Smitt is correct in considering Busk's *Membranipora magnilabris* as the membranipora form of the same species. The only difference I can detect in the Australian specimens is that the ordinary cells are more quadrate, and that the large rounded opercula are usually denticulate on the margin. The fossil *Eschara elegans* of Milne Edwards is considered by Smitt to be the same species, but I think that determination doubtful, and I have therefore adopted Busk's specific name.

It is found as a single layer encrusting other objects, or partly free and foliaceous; at other times it consists of two layers united back to back. The specimens are sometimes of considerable size, and one presented to the Museum by Mr. Goldstein forms an irregular foliaceous mass measuring about 13 inches long by 9 inches wide and 6 inches high.

---

* In different descriptions "zoarium" is used for "polyzoary," "zoœcium" is used for "cell," and "oœcium" is used instead of "ovicell."

The cells are large, mostly quadrate, the margins thick and raised, and with the external membrane tightly stretched across the aperture. The movable lip is very large, occupying about half the aperture, and is of two forms. Most of the cells are quadrate at the anterior extremity, and in these the square operculum is strengthened by a fine band at a little distance from and nearly parallel to the margin. Other cells, usually of a larger size, and frequently situated at the bifurcation of a series, are rounded in front; in these the operculum is strengthened by two bands, which converge from the base in an arched form, and when close to the margin slightly diverge again, becoming blended with the marginal corneous rim. This form of operculum is generally finely denticulate at the margin. When the outer membrane is removed, the margins of the cells are seen to be thick, calcareous, the portion behind the attachment of the operculum bevelled inwards, the bevelled surface being finely granular; the part corresponding to the margin of the operculum forms a smooth, deeply vaulted arch, the posterior angles of which are produced into a tubercle on each side for the attachment of the corners of the lip. The inner wall is a thin calcareous lamina, pierced by numerous white-bordered pores; it recedes downwards and forwards, the anterior part being very abrupt, and opens by a nearly circular sloping mouth, with raised cylindrical margins. Immediately behind this opening a square plate extends upwards and backwards to the articulating base of the operculum, its lateral edges being turned down and united to the lamina so as to form a sort of recess or pouch. The posterior part of the raised inner orifice is united to this plate.

Explanation of Figures.

Plate 60.—Fig. 1, specimen, natural size. Fig. 1*a*, portion, magnified, showing membranous layer, two sorts of cells, the one quadrate with smooth-edged opercula, strengthened by a square-shaped horny band, parallel to and at a little distance from the margin, the other rounded anteriorly, with rounded denticulate opercula and different shaped strengthening bands. Fig. 1*b*, portion denuded of membrane, magnified. Fig. 1*c*, two quadrate cells from the same, more highly magnified, showing the raised bevelled edges, the receding perforated calcareous wall, the internal mouth and the plate to the articulating base of the operculum with its edges turned down and continuous with the front of the lamina.

PLATE 60, FIG. 2.

PETRALIA UNDATA (P. MacGil.).

[Genus PETRALIA (P. MacGil.). Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-ord. Cheilostomata. Fam. Escharidæ.)

Gen. Char.—Polyzoary stony, expanded, erect, fenestrate, formed of a single layer of cells placed horizontally side by side and distinct throughout the whole thickness of the polyzoary.]

Description.—Fenestræ broadly elliptical, margins tubercular, and with one or two large avicularia at the base of each in front. Cells quadrate, expanded above, slightly narrowed at the middle and below, separated by narrow raised lines; front tubercular and perforated; mouth circular, with a short broad transverse avicularium immediately below the lower lip. Behind, the cells are quadrate, deeply areolated and separated by channels, at the bottom of which is a narrow elevated ridge. Ovicells large, globular, closely punctate; frequently one or more immovable processes, surmounted by sessile avicularia, rise from various parts of the ovicell.

Reference.—P. H. MacGillivray, Trans. Roy. Soc. Vict., 1868.

Portland, Miss F. Birkett; Queenscliff.

The polyzoary forms an expanded wavy frond, probably of considerable size, as all the specimens I have seen are broken on the edges. The avicularia occur in three different forms. Immediately below the mouth of each cell is a short transverse sessile avicularium, and at the lower edge of each foramen one or two large sessile avicularia take the place of ordinary cells. In addition to these the ovicells have usually one or more calcareous processes on various parts of the surface, each surmounted by a small sessile avicularium. The ovicells are crowded in patches, frequently united to each other, and on the cells supporting them are numerous sessile avicularia, usually on raised calcareous bases and generally arranged along the margins and round the mouths.

The only other genus of *Escharidæ* with a foraminate polyzoary, the cells of which are disposed in one plane, is *Retepora*. The arrangement of the cells, however, is very different in the two genera. In *Retepora* they are oblique and rest on a common calcareous basis, while in *Petralia* there is no such basis, but the cells are horizontal and as distinct on the back of the polyzoary as in the front.

EXPLANATION OF FIGURES.

PLATE 60.—Fig. 2, front view of specimen, natural size. Fig. 2*a*, back view of same. Fig. 2*b*, portion of front, magnified, showing a foramen with tubercular margins; at the base are seen two large avicularia replacing cells. Fig. 2*c*, portion of back, magnified, showing the distinct areolated cells, separated by raised ridges at the bottom of channels. Fig. 2*d*, small portion, magnified, showing three ovicells, one of which is studded with avicularia; numerous sessile avicularia, mostly on calcareous bases, are seen on the cells with which the ovicells are connected. Fig. 2*e*, fractured edge of polyzoary, to show the cells distinct throughout the whole thickness; the fracture was obliquely across the cells.

I am indebted to my friend Mr. MacGillivray for the specimens and descriptions of the two Polyzoa on this plate.

FREDERICK McCOY.

By Authority: JOHN FERRES, Government Printer.

CONTENTS OF DECADES.

N.B.—The originals of all the Figures are in the National Museum, Melbourne.

DECADE I.

Plate 1.—The Black Snake (Pseudechys porphyriacus, Shaw sp.).
Plate 2.—The Copper-head Snake (Hoplocephalus superbus, Günth.).
Plate 3.—The Tiger Snake (Hoplocephalus curtus, Schl. sp.).
Plate 4.—The Australian Bream (Chrysophrys Australis, Günth.).
Plate 5.—The Spiny-sided Butterfly-Gurnard (Lepidotrigla Vanessa, Rich. sp.).
Plate 6.—The Kumu Gurnard (Trigla Kumu, Lesson and Garn.).
Plate 7.—The Australian Giant Earth-worm (Megascolides Australis, McCoy).
Plate 8.—Lewin's Day-moth (Agarista Lewini, Boisd.).
The Loranthus Day-moth (Agarista Casuarinæ, Scott).
The Vine Day-moth (Agarista Glycine, Lewin sp.).
Plate 9.—Pieris (Thyca) Harpalyce (Don. sp.).
Plate 10.—Pieris (Thyca) Aganippe (Don. sp.).

DECADE II.

Plate 11.—The Little Whip Snake (Hoplocephalus flagellum, McCoy). The White-lipped Snake (Hoplocephalus coronoides, Günth.).
Plate 12.—The Death Adder (Acanthophis Antarctica, Shaw sp.).
Plate 13.—The Carpet Snake (Morelia variegata, Gray).
Plate 14.—The Gippsland Perch (Lates colonorum, Günth.).
Plate 15.—The Murray Lobster (Astacoides serratus, Shaw sp.).
Plate 16.—The Salmon Arripis (Arripis truttaceus, Cuv. sp.). Adult.
Plate 17.—Ditto of the younger forms and coloring.
Plate 18.—The Horse Mackerel (Trachurus trachurus, Lin. sp.).
Plate 19.—The Small-scaled Rock Cod (Lotella callarias, Günth.).
Plate 20.—The Australian Rock Cod (Pseudophysis barbatus, Günth.).

DECADE III.

Plate 21.—The Sea-Leopard Seal (Stenorhynchus leptonyx, de Blainv. sp.).
Plate 22.—The Yellow-sided Dolphin (Delphinus Novæ Zealandiæ, Quoy and Gaim.).
Plate 23.—The Common Brown Snake (Diemenia superciliosa, Fisch.).
The Small-scaled Brown Snake (Diemenia microlepidota, McCoy).
The Shield-fronted Brown Snake (Diemenia aspidorhyncha, McCoy).
Plate 24.—Catenicella margaritacea (Busk).—C. plagiostoma (Busk).—C. ventricosa (Busk).—C. hastata (Busk.)—C. rufa (McG.).—C. cribraria (Busk).—C. alata (Wyv. Thomson).—C. lorica (Busk).—C. formosa (Busk).—C. elegans (Busk).—C. perforata (Busk).—C. Buskii (Wyv. Thomson).—C. Hannafordi (McG.).—C. crystallina (Wyv. Thomson).—C. carinata (Busk).—C. aurita (Busk).—C. geminata (Wyv. Thomson).—C. cornuta (Busk).—C. intermedia (McG.)
Plate 25.—Membranipora membranacea (Linn. sp.).—M. perforata (McG.).—M. ciliata (McG.).—M. mamillaris (McG.).—M. umbonata (Busk).—M. pilosa (Linn. sp.).—M. cervicornis (Busk).
Plate 26.—Membranipora dispar (McG.).—M. Woodsii (McG.).—M. lineata (Linn. sp.).—M. Rosselii (Audouin sp.).—M. Lacroixii (Savigny sp.).
Plate 27.—The Australian Rockling (Genypterus Australis, Cast.).
The Yarra Blackfish (Gadopsis gracilis, McCoy).
Plate 28.—The Southern Mackerel (Scomber pneumatophorus, De la Roche).
Plate 29.—The Yabber Crayfish (Astacoides bicarinatus, Gray sp.).
Plate 30.—The Large Wattle Goat-Moth (Zeuzera Eucalypti, Boisd. Herr.-Schæf.).

DECADE IV.

Plate 31.—The Australian Sea-Bear or Fur-Seal (Euotaria cinerea, Péron sp.).
Plate 32.—The Two-hooded Furina-Snake, Furina bicucullata (McCoy).
Plate 33.—The Banded Red Gurnet-Perch (Sebastes percoides, Solander sp.).
Plate 34.—The Angel-fish (Rhina squatina, Lin. sp.).
Plate 35.—Lepralia circinata (McG.).—L. Cecilii (Aud.).—L. diaphana (McG.).—L. marsupium (McG.).—L. subimmersa (McG.).—L. anceps (McG.).—L. Maplestonei (McG.).
Plate 36.—Lepralia vittata (McG.).—Membranipora perforata. Lepralia Brogniartii (Aud.).—L. elegans (McG.).—L. pertusa (Esper. sp.).—L. Malusii (Aud. sp.).—L. lunata (McG.).
Plate 37.—Lepralia ciliata (Linn. sp.).—L. trifolium (McG.).—L. cheilodon (McG.).—L. canaliculata (McG.).—L. larvalis (McG.).—L. diadema (McG.).—L. papillifera (McG.).—L. Ellerii (McG.).
Plate 38.—Lepralia monoceros (Busk).—L. excavata (McG.).—L. vitrea (McG.).—L. megasoma (McG.).—L. Schizostoma (McG.).—L. Botryoides (McG.).—L. ferox (McG.).—L. pellucida (McG.).
Plate 39.—Crisia Edwardsiana (D'Orb. sp.).—C. biciliata (McG.).—C. acropora (Busk).—C. setosa (McG.).—C. tenuis (McG.).
Plate 40.—Saunders' Case-Moth (Metura elongata, Saunders sp.).
The Lictor Case-Moth (Entometa ignobilis, Walk.).

DECADE V.

Plate 41.—The Lace Lizard (Hydrosaurus varius, Shaw sp.).
Plate 42.—The Spotted Marsh-Frog (Limnodynastes Tasmaniensis, Günth.).—The Common Sand-Frog (Limnodynastes dorsalis, Gray).
Plate 43.—The Carpet Shark (Crossorhinus barbatus, Lin. sp.).—The Seven-gilled Shark (Notidanus [Heptanchus] Indicus, Cuv.).
Plate 44.—The Barracouta (Thersites atun, Cuv.).—The Tunny (Thynnus Thynnus, Lin. sp.).
Plate 45.—Flustra denticulata (Busk).—Carbasea episcopalis (Busk).—C. dissimilis (Busk).—C. indivisa (Busk).—C. elegans (Busk).—C. pisciformis (Busk).
Plate 46.—Spiralaria florea (Busk).—Diachoris Magellanica (Busk).—D. spinigera (P. McGil.).—Dimetopia spicata (Busk).—D. cornuta (Busk).—Didymia simplex (Busk).—Calwellia bicornis (Wyv. Thomson).
Plate 47.—Dictyopora cellulosa (P. McGil.).
Plate 48.—Eschara obliqua (P. McGil.).—E. dispar (P. McGil).—E. gracilis (Lamx.).—E. platalea (Busk).—E. quadrata (P. McGil.)—E. mucronata (P. McGil.).—Caleschara denticulata (P. McGil.).
Plate 49.—Cellaria fistulosa (Linn.).—C. hirsuta (P. McGil.).—C. tenuirostris (Busk.).—C. gracilis (Busk).—Nellia oculata (Busk).—Tubucellaria hirsuta (Busk).
Plate 50.—The Great Black, or Manna Cicada (Cicada mœrens, Germ.).—The Great Green Cicada (Cyclochila Australasiæ, Donov. sp.).

CONTENTS OF DECADE VI.

N.B.—The originals of all the Figures are in the National Museum, Melbourne.

PLATE 51.—The Victorian Rhodona (Rhodona Officeri, McCoy).

PLATE 52.—The Black and White Ringed Snake (Vermicella annulata, Gray).

PLATE 53.—The Green and Golden Bell-Frog (Ranoidea aurea, Less. sp.).

PLATES 54-55.—The Australian Aulopus (Aulopus purpurisatus, Rich.).

PLATE 56.—The Hammer-headed Shark (Zygæna malleus, Shaw).—The Common Australian Saw-Fish (Pristiophorus nudipinnis, Günth.).

PLATE 57.—Biflustra perfragilis (McGil.).—B. delicatula (Busk).

PLATE 58.—Cellularia cuspidata (Busk).—Menipea crystallina (Gray sp.).—M. cyathus (Wyv. Thomson).—M. cervicornis (McGil.)—M. tricellata (Busk).—M. Buskii (Wyv. Thomson).

PLATE 59.—Bicellaria tuba (Busk).—B. grandis (Busk).—B. ciliata (Linn.).—B. turbinata (McGil.)—Stirparia annulata (Map.).—Bugula neritina (Linn.).

PLATE 60.—Steganoporella magnilabris (Busk sp.).—Petralia undata (McGil.).

Natural History of Victoria.

PRODROMUS

OF THE

ZOOLOGY OF VICTORIA;

OR,

FIGURES AND DESCRIPTIONS OF THE LIVING SPECIES OF ALL CLASSES

OF THE

VICTORIAN INDIGENOUS ANIMALS.

DECADE VII.

BY

FREDERICK McCOY, F.R.S.,

HONORARY FELLOW OF THE CAMBRIDGE PHILOSOPHICAL SOCIETY; HONORARY ACTIVE MEMBER OF THE IMPERIAL SOCIETY OF NATURALISTS OF MOSCOW; CORRESPONDING MEMBER OF THE ZOOLOGICAL SOCIETY OF LONDON; HONORARY MEMBER OF THE ROYAL SOCIETY OF NEW SOUTH WALES; HONORARY MEMBER OF SEVERAL OTHER SCIENTIFIC SOCIETIES, ETC.
PROFESSOR OF NATURAL SCIENCE IN THE MELBOURNE UNIVERSITY.
DIRECTOR OF THE NATIONAL MUSEUM OF NATURAL HISTORY AND GEOLOGY OF MELBOURNE, ETC.

MELBOURNE:
BY AUTHORITY: JOHN FERRES, GOVERNMENT PRINTER.
PUBLISHED BY GEORGE ROBERTSON, LITTLE COLLINS STREET.
LONDON: TRÜBNER AND CO., 57 AND 59 LUDGATE HILL; AND GEORGE ROBERTSON,
17 WARWICK SQUARE.

M DCCC LXXXII.

Natural History of Victoria.

PRODROMUS

OF THE

ZOOLOGY OF VICTORIA;

OR,

FIGURES AND DESCRIPTIONS OF THE LIVING SPECIES OF ALL CLASSES

OF THE

VICTORIAN INDIGENOUS ANIMALS.

DECADE VII.

BY

FREDERICK McCOY, F.R.S.,

HONORARY FELLOW OF THE CAMBRIDGE PHILOSOPHICAL SOCIETY; HONORARY ACTIVE MEMBER OF THE IMPERIAL SOCIETY
OF NATURALISTS OF MOSCOW; CORRESPONDING MEMBER OF THE ZOOLOGICAL SOCIETY OF LONDON;
HONORARY MEMBER OF THE ROYAL SOCIETY OF NEW SOUTH WALES; HONORARY MEMBER OF SEVERAL OTHER
SCIENTIFIC SOCIETIES, ETC.
PROFESSOR OF NATURAL SCIENCE IN THE MELBOURNE UNIVERSITY.
DIRECTOR OF THE NATIONAL MUSEUM OF NATURAL HISTORY AND GEOLOGY OF MELBOURNE, ETC.

MELBOURNE:
BY AUTHORITY: JOHN FERRES, GOVERNMENT PRINTER.
PUBLISHED BY GEORGE ROBERTSON, LITTLE COLLINS STREET.
LONDON: TRÜBNER AND CO., 57 AND 59 LUDGATE HILL; AND GEORGE ROBERTSON,
17 WARWICK SQUARE.

M DCCC LXXXII.

PREFACE.

It having been considered desirable to ascertain accurately the natural productions of the Colony of Victoria, and to publish works descriptive of them, on the plan of those issued by the Governments of the different States of America, investigations were undertaken, by order of the Victorian Government, to determine the Geology, Botany, and Zoology of the Colony, to form collections illustrative of each for the public use, and to make the necessary preparations for such systematic publications on the subject as might be useful and interesting to the general public, and contribute to the advancement of science.

As the geological and botanical investigations have already approached completion, and their publication is far advanced, it has been decided to commence the publication of the third branch completing the subject, namely, that of the Zoology or indigenous members of the different classes of the animal kingdom.

As the Fauna is not so well known as the Flora, it was a necessary preliminary to the publication to have a large number of drawings made, as opportunity arose, from the living or fresh examples of many species of reptiles, fish, and the lower animals, which lose their natural appearance shortly after death, and the true characters of many of which were consequently as yet unknown, as they had only been described from preserved specimens. A Prodromus, or preliminary issue, in the form of Decades, or numbers of ten plates, each with its complete descriptive letterpress, will be published, of such illustrations as are ready, without systematic order or waiting for the completion of any one branch. The many good observers in the country will thus have the means of accurately identifying various natural objects, their observations on which, if recorded and sent to the National Museum, where the originals of all the figures and descriptions are preserved, will be duly acknowledged, and will materially help in the preparation of the final systematic volume to be published for each class when it approaches completion.

This seventh Decade gives detailed figures and descriptions in the first two plates of those most interesting molluscs, the Argonauts, as represented by one of the species occurring in some summers not uncommonly in our bay, and in which the rare chance of finding the Cuttlefish in its so-called Paper-Nautilus Shell has been taken advantage of to give details which will be welcome to scientific men at home as well as here.

The third plate shows the characters of the new Australian blue-spotted Eagle-Ray, or Sting-Ray, not figured before.

The fourth plate illustrates one of the large and formidable Sharks (*Odontaspis*), the terror of bathers, not uncommon in our bay, and also the new Australian Tope, a smaller Shark, or Dogfish, formerly confounded with the English Tope, and not figured before.

The fifth plate illustrates one of those curious forms intermediate between Pipe-fishes and the Sea-horses, named *Phyllopteryx*, or Leafy Sea-dragons ; also our commonest little species of Sea-horse, not figured before.

The next three plates continue the illustrations of our native Polyzoa, for the contribution of which to the National Museum and this work I am indebted to Dr. MacGillivray.

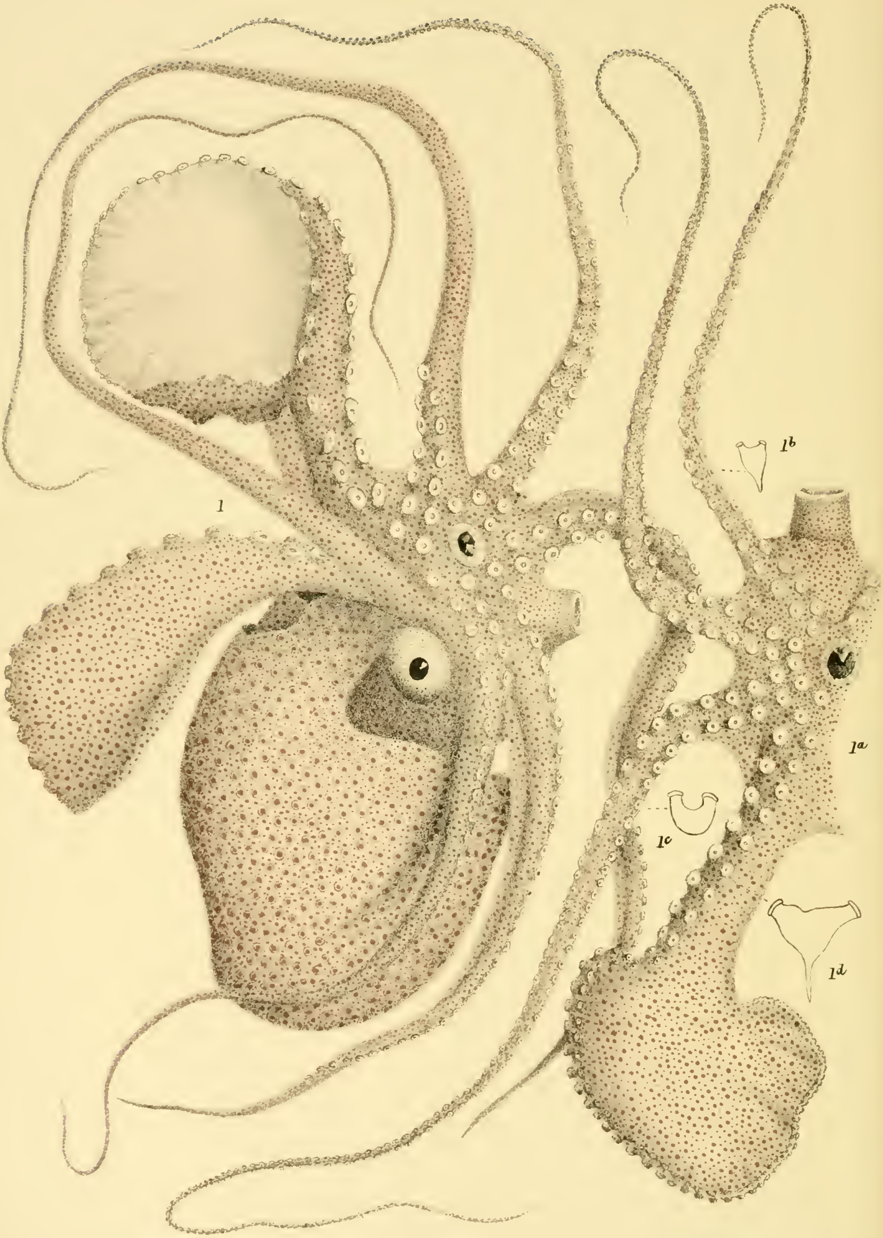
The ninth and tenth plates give figures for the first time of two magnificent new species of those gigantic Insects of the *Phasma* group, in which Australia is so rich, and the resemblance of which, when at rest, to leaves and twigs of the trees they frequent is such a curious subject of speculation.

The succeeding Decades will illustrate as many different genera as possible, and will deal first usually with species of some special interest, and of which good figures do not exist, or are not easily accessible.

FREDERICK McCOY.

11th November 1881.

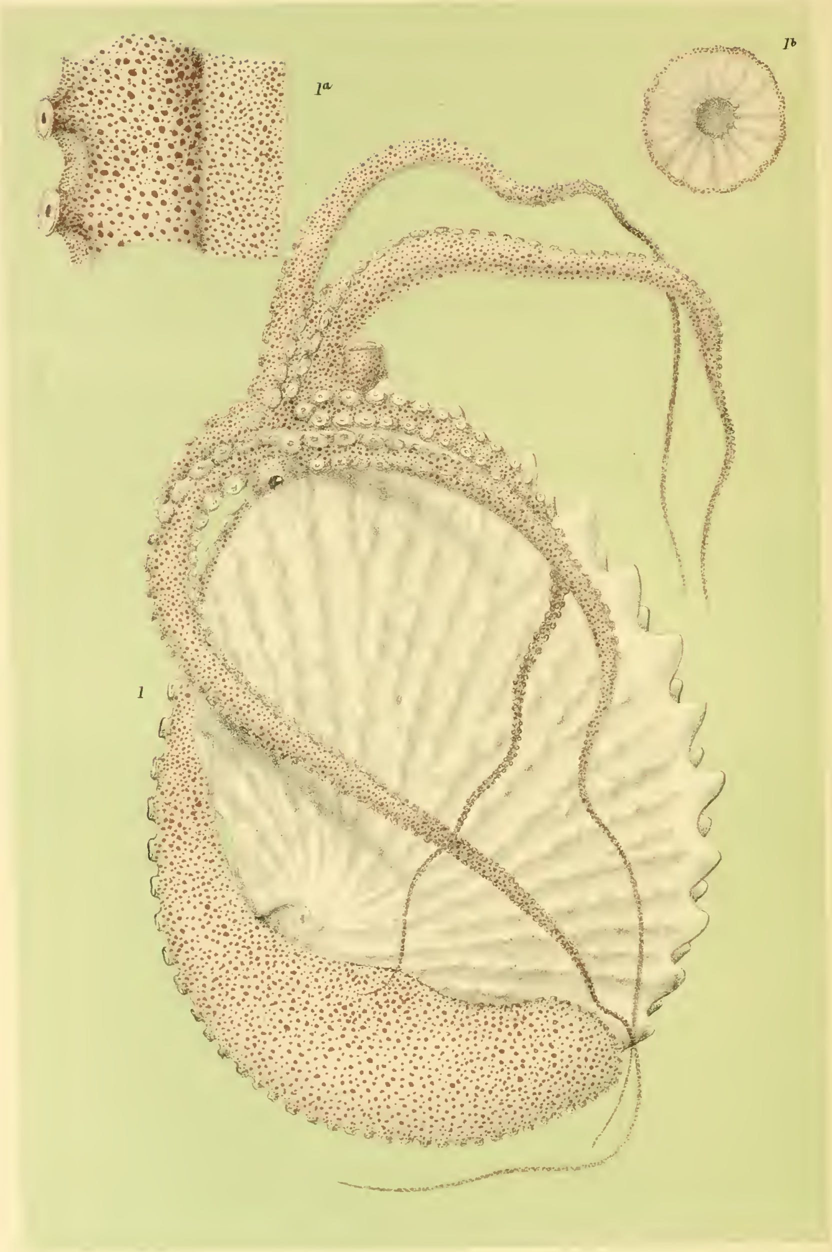
P.S.—The recent fire at the Government Printing Office has caused a delay in the issue of this Decade, the revise of which bore the above date, but which is only now published.—F. McC., 12/9/82.



A Bartholomew del et lith

Prof Mc Coy dirext

Steam litho Govt. Printing Office



A Bartholomew del et lith

Prof McCoy direxᵗ

Steam litho Govt Printing Office

Plates 61 and 62.

ARGONAUTA ORYZATA (Meusch.).

The Tuberculated Argonaut, or Paper-Nautilus.

[Genus ARGONAUTA (Lin.) = OCYTHOË (Rafinesque). (Sub-kingd. Mollusca. Class Cephalopoda. Order Acetabulifera. Sub-order Octopoda. Family Argonautidæ.)

Gen. Char.—Three anterior or inferior pairs of arms subulate, gradually tapering from base to apex. Superior or posterior pair forming two very broad expansions, by the recurving of the terminal portion backwards in a broad curve, connected by a thick flat expansion with the middle portion; the two rows of suckers, like those of the other arms, bordering the edge. Two rows of large cylindrical or sub-pedunculated suckers on each arm; a broad membranous keel on back of lower and upper pairs of arms; the two middle pairs not keeled. Two aquiferous openings at upper posterior edge of eye. Ears small, behind the eyes, under the cervical band. A projecting button on inside of mantle fits in a groove at base of funnel on each side. Cervical band moderate. Eyes very large, globose, covered by the colored skin of the body, except over the pupil. *Shell* very thin, white, flexible when wet, equilateral, spirally involute in one plane, radiatingly plicated or tuberculated on the flattened sides, with a bicarinate, shallow channel on the narrow periphery; aperture very wide behind, triangular; no chambers or septa. Nucleus very large, hemispherical.]

Description.—*Female:*—body ovoid, convex in front, concave behind, obtusely pointed below. Arms:—three anterior pairs long and slender; 1st longest, 2nd, 3rd, and 4th[*] successively shorter, measuring from mouth between the rows of suckers to the tip; 1st or posterior dilated pair strongly keeled on back, with a broad membranous web; suckers of outer row longer than those of inner row; 2nd and 3rd pairs of arms not keeled, simply rounded on back[†]; 4th or anterior pair, with a very prominent membranous keel on back. *Color:* whole skin of surface thin, with close-set minute round spots forming purple circular clusters (about 2 or 3 in a space of 3 lines) as big as a small pin's head, with paler and smaller dots between. Beaks black, not compressed. The inside of the palmated expansion of the 1st or posterior pair of arms is whitish without the chromatic, or color glands, of the general outer surface.

About 80 pairs of suckers on the large palmated arm, but becoming very small and alternate so as to look like one irregular line towards the recurved extremity. About 75 pairs on 2nd arm; about 64 pairs on 3rd arm; about 80 pairs on 4th or anterior arm. The suckers towards the thread-like tip of each arm almost too small to count, but a little over 2 lines in diameter at base, elevated on thick cylindrical peduncles of about the same diameter as the discs. The outer row of suckers on each palmated arm longer than those of inner row, and connected with each other by a slight web; rows on the other arms equal. The anterior (or 4th) pair of arms are connected together at base by a web about 4 lines high crossing over the funnel, and they have an extension of the membranous keel of the outer mid-line, forming at the base a triangular, vertical, suspensory ligament for the funnel on each side.

---

[*] Dr. Gray states the order of their length as 1, 2, 4, 3.

[†] Dr. Gray, in his Cephalopoda Antepedia, page 32, says "the 2nd and 3rd pairs keeled on the outer side," I suppose by mistake, as they are destitute of the prominent keel of the 1st and 4th pairs, and are simply rounded.

There is a transparent web, about 3 lines high, between the base of the 4th and 3rd pair of arms, but none between the bases of the 3rd and 2nd; between the 2nd and 1st or palmated arms the transparent web is about 3 lines high.

Measurements.	Ins.	lines.
Length of body from base of head	3	0
Greatest width, about	2	0
Length of anterior arm	5	9
,, next arm	6	3
,, next arm	8	9
,, sucker line of posterior or palmated arm	10	6
,, posterior arm to distal part of curve	5	7
Width of membrauous keel on outside of posterior arm	0	3
Depth of arms near base	0	3
Diameter of eye	0	9
Width of cervical ligament	0	7

Shell: moderately compressed; periphery narrow, bituberculate; sides with narrow, transverse, radiating, arched ridges, occasionally branching, and with shorter intercalated ones as they radiate towards the periphery, rising into longitudinal, ovate tubercles, like grains of rice. Antero-posterior diameter of moderate specimen, 5 in. 6 lines; width of periphery from tip of one tuberculated keel to the other, 9 lines; greatest transverse width of aperture (near middle), 2 in. 3 lines; near margin, 5 ridges in space of one inch; 4 tubercles along each ridge in space of one inch.

REFERENCE.—(Shell) = *Argonauta oryzata* (Meusch.) Mus. Geversianum = *A. nodosa* (Solander) Portland Catal. = *A. tuberculata* (Shaw) Nat. Mis. v. 23, t. 995 = *A. tuberculosa* (Schumacher) Lam. Anim. s. Vert. 2nd edit. (Animal) = *Octopus raricyathus* (Blainv.) = *Ocythoë raricyathus* (Gray) Cat. B.M. Ceph. Anteped. Pt. 1, p. 32.

The beautiful objects popularly miscalled Paper-Nautili should not really be compared with true shells, like that of the *Nautilus*, to which the inhabitant is fixed by organic attachments, without tearing which or destroying the life of the Cuttle-fish it would be impossible to separate them. The Argonaut, or Paper-Nautilus, is always excessively thin, white, imperfectly calcified, so as to be slightly flexible when fresh, and totally unconnected with the *Octopus* inhabiting it; so that the so-called shell may be dropped if the Cuttle-fish be frightened, without injuring any of the soft parts of the animal. This want of connection between the Argonaut and its inhabitant was known even to Aristotle. The animal, which was called *Ocythoë* by Rafinesque, inhabiting the Argonaut shell is shaped to fit in the inrolled spire by a peculiarity of form in the body not found in any other of the *Acetabulifera*, namely, the profile of the back being concave, while the front is convex; this recurving of the posterior end according in shape with the cavity of the so-called shell, which is retained in its place by the pair of enlarged, racket-shaped posterior arms bent backwards and closely embracing it.

All the shells, with their inhabitants, are females, and I have not yet succeeded in finding the male; which in this genus has all the arms tapering, is very much smaller than the female, and without shell. The Mediterranean shelled Argonauts usually have a curious, swollen, detached arm of the male adhering to them, like a parasitic worm, obviously having functions connected with the fertilisation of the eggs, but formed into a supposed genus of parasites, named *Hectocotyle*, by Cuvier; and these too have escaped notice in the Australian examples.

Like most of the eight-armed Cuttle-fishes, the Argonauts have a short, thick, round body, without fins, and without any internal hard parts, such as the so-called Cuttle-fish bone, or pen, of the higher, ten-armed families. The eyes, as usual in this group, are fixed immovably, and covered by the colored general skin, except in front of the pupil.

No one now believes the old idea that the shell, floating like a boat on the surface of the sea, is rowed along by the dependent slender arms, while the pair of broad arms are held up like sails to propel it by catching a favorable wind, like an ancient galley. The progress through the water is only effected by backward starts, produced by ejecting water violently through the funnel, the 3 anterior pairs of arms streaming out in a group in front, while the shell, covered over by the expansion of the posterior or superior pair, cleaves the water.

Like all the *Octopoda* the Argonauts are generally nocturnal, and inhabit the high seas, feeding on various floating small animals; rarely coming near the surface by day, except in calm weather. The females only approach the shallow waters of the coast in summer time, when the eggs are developed. It is in the hottest months of summer (January, February, and March), especially in the last few years, that they appear on the shores of Hobson's Bay, near Brighton, where several specimens of the animal and shell together have been obtained. The individual figured was given to me alive by a young friend (who requested that his name should not be mentioned), and was kept alive in a large tub of sea-water for a considerable time. Nothing could be more ludicrously interesting than the vigilant look-out which the creature maintained, watching suspiciously, with its large perfect eyes just peeping over the edge of the shell in which it nestled, as represented in our plate, with the arms often curled inside along with the body when at rest ; at other times they hung outside or streamed in a close group in front, when the animal and shell darted backwards by shooting water out of the funnel in front of the head. Occasionally it crawled about on the bottom, head downwards, with the shell covering over its upper part. When greatly frightened it abandoned the shell and darted away with great velocity, but got back into it again when left alone. The colors varied in a few seconds from the palest pink to rich madder purple, according apparently to the will or temper of the creature. This coloring of the surface of the body, like naked Cuttle-fishes, is another reason for believing that the shell is not a permanent habitation, but a temporary egg-case ; which, moreover, does not accurately fit the body, as if moulded on it, but is undoubtedly secreted by the inner side of the large expanded posterior pair of arms. For this reason also the greater number of perfect shells found are empty.

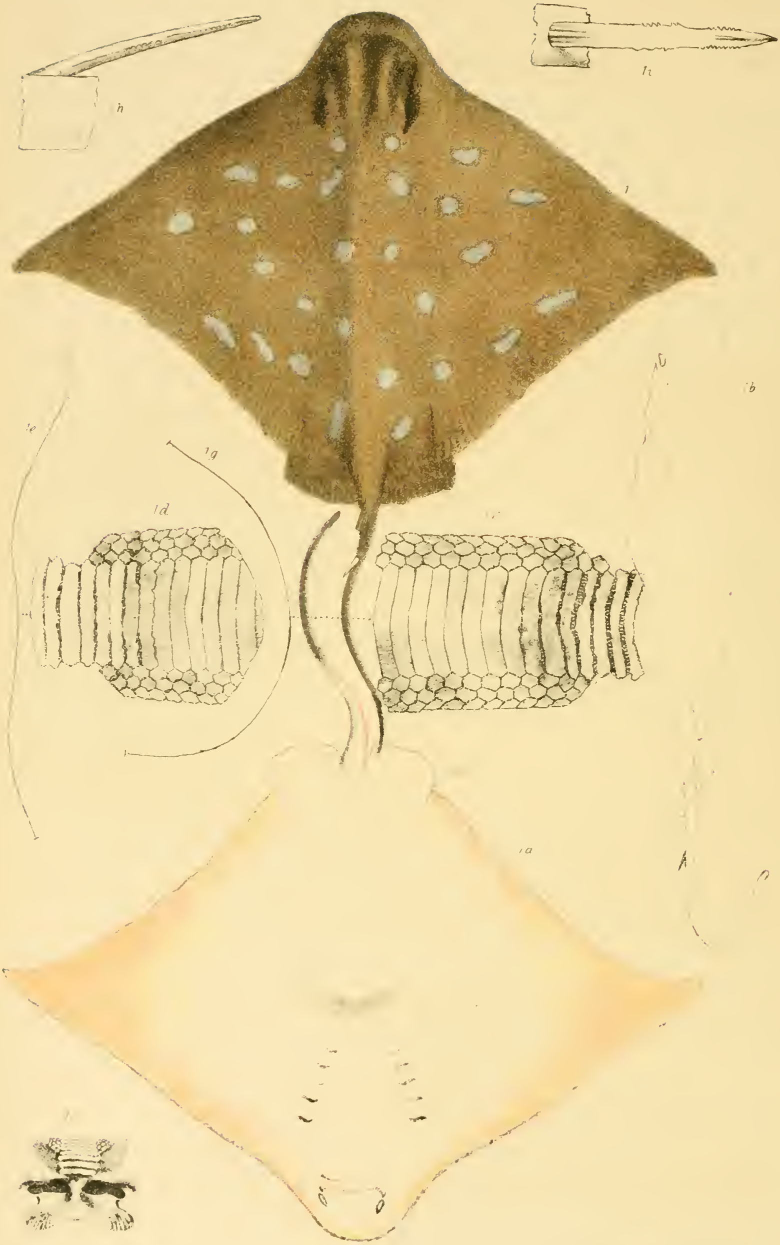
The specimens figured are from rocky parts near Brighton, but the so-called shells are found occasionally on all parts of the coast of the colony.

Explanation of Figures.

Plate 61.—Fig. 1, side view of animal, withdrawn from the shell, showing the recurved form of the posterior part of body, the broad nuchal or cervical ligament, the eyes, mouth, beaks, and funnel, with the membranous keels on the anterior pair of slender arms and the broad posterior pair of dilated, shell-bearing ones, natural size. Fig. 1*a*, view of arms of one side of the same, natural size, viewed from above, showing the relative length of the arms, the broad ligamentous web between the anterior pair of arms in front crossing above the funnel, the small webs between the bases of the 1st and 2nd pair and of the 3rd and 4th pairs, and their absence between the bases of the 2nd and 3rd pairs. Fig. 1*b*, section of 1st pair of arms, showing the keel on back. Fig. 1*c*, section showing form of rounded unkeeled back of 2nd and 3rd pairs of arms. Fig. 1*d*, section of hind pair of dilated arms, showing the greater projections of outer row of suckers, and the broad webbed keel on back.

Plate 62.—Fig. 1, animal seated in the shell, embracing and supporting the hinder part with the dilated posterior pair of arms, natural size. Fig. 1*a*, side view of portion of base of posterior arms, showing the broad, membranous keel on back, and the small web between the suckers, magnified. Fig. 1*b*, one of the suckers, viewed from above, showing the retractile centre by which the adhesion to other bodies is caused, magnified.

Frederick McCoy.



Drawn by A. Bartholomew   Prof. M'Coy direxit   F. Schoenfeld lith.

PLATE 63.

MYLIOBATIS AUSTRALIS (MACLEAY).

THE BLUE-SPOTTED EAGLE-RAY.

[Genus MYLIOBATIS (CUV.). (Sub-kingd. Vertebrata. Class Pisces. Order Plagiostomata. Sub-order Batoidei. Family Myliobatidæ.)

Gen. Char.—Head rounded, much elevated, with a flattened, rounded, fleshy expansion in front, distinct from the disc, which is formed by the lateral development of the pectoral fins. Nasal valves coalescing to form a broad, transverse, median, oblong flap, with a concave, fringed, posterior margin. Mouth with rectilinear edges, the lower not extending in front of the upper. Teeth hexagonal, flat, the middle row much wider than long, those of the lateral rows having the length and width nearly equal. Tail long, slender, with a dorsal fin near its base, and a small serrated spine behind the dorsal fin.* Eyes directed laterally, each with a very large spiracle close behind it; no upper eyelid.]

DESCRIPTION.—*Body:* Smooth, rhomboidal; pectoral fins moderately acute and falcate at the tips; anterior edge nearly straight, very slightly convex except near the tip, posterior margin sigmoid, slightly convex near posterior acute angle, and gently concave towards the apex; anterior margin in front of head obtuse, semi-elliptically rounded, the rounded angular junction with the anterior border of the pectoral disc being in about a line connecting the middle of the eyes; an obtuse ridge over each orbit converging to back part of head, leaving a deep concave median hollow. Disc from tip to tip of pectorals less than twice the length to posterior base of ventral fins, more nearly twice from anterior edge of snout to posterior edge of pectoral fin. Ventrals subquadrate. Dorsal fin more than the length of its base behind the posterior root of the ventrals, or its middle about over the posterior edge of the ventrals. Spine a rather less distance behind the posterior edge of dorsal. Tail beyond the spine suddenly reduced in diameter, forming a long slender termination (imperfect in our specimen, and therefore its length cannot be given). *Teeth:* Median teeth of upper jaw 7½ times wider than long (or 7½ in a space equal to the width of one); length and width of the lateral teeth nearly equal. *Color:* Uniform yellowish olive-brown above, with about 26 or 28 large light-blue rounded spots, irregular in shape and distribution, over the disc; underside white in the centre, becoming pinkish-brown and yellowish towards the margins of the pectoral.

Measurements.	Ft.	ins.	lines.
Length from anterior edge of snout to base of tail at posterior root of ventrals	2	5	0
Width from tip to tip of pectorals	4	1	0
Antero-posterior diameter of eyes	0	1	3
" " spiracles	0	2	3
Distance between the eyes	0	5	9
Rounded projection in front of head	0	2	0
From tip of snout to posterior base of pectorals	2	1	0
Width of posterior margin of ventrals	0	6	6

---

* Dr. Günther states that in young individuals the tail is much longer than in old ones, and that the median teeth re regularly hexagonal and of the same size as the lateral ones.

Measurements.	Ft.	ins.	lines.
Length of inner margin	0	3	0
„ outer „	0	5	0
From posterior edge of ventral to anterior edge of dorsal fin	0	2	3
Length of dorsal	0	2	7
Greatest height of dorsal	0	1	0
From posterior edge of dorsal to spine	0	2	0
Length of exposed part of spine	0	1	5
Width at base...	0	0	3
Greatest width of nasal flap	0	4	9
Width of middle and 3 lateral rows of teeth on each side, taken together	0	2	5

Reference.—Macleay, Des. Cat. Aust. Fish, vol. 2, p. 316.

Mr. Macleay has very properly separated this as a distinct species; as it is easily distinguished from the *M. Nieuhofi* by its more obtuse pectorals, less width of disc, and the much greater number of median teeth in a space equal to their width (only 3 or 3½ in *M. Nieuhofi*), more rounded and much shorter muzzle, as well as by the spotted instead of striped disposition of the blue color.

The only specimen I have seen of this species I obtained many years ago at Queenscliff, and presented to the National Museum, no other example having since occurred.

This handsome Eagle-ray has not been figured before.

Explanation of Figures.

Plate 63.—Fig. 1, upper side, one-tenth natural size. Fig. 1*a*, under side, one-tenth natural size. Fig. 1*b*, profile view, one-tenth natural size. Fig. 1*c*, view of nasal flap, nostrils, and teeth of upper jaw. Fig. 1*d*, teeth of lower jaw, one-half the natural size. Fig. 1*e*, flattened antero-posterior surface of dental series. Fig. 1*f*, teeth of upper jaw, half the natural size. Fig. 1*g*, more curved antero-posterior surface of upper dental series. Fig. 1*h*, side view of spine and attached portion of tail, natural size. Fig. 1*i*, dorsal view of spine, natural size.

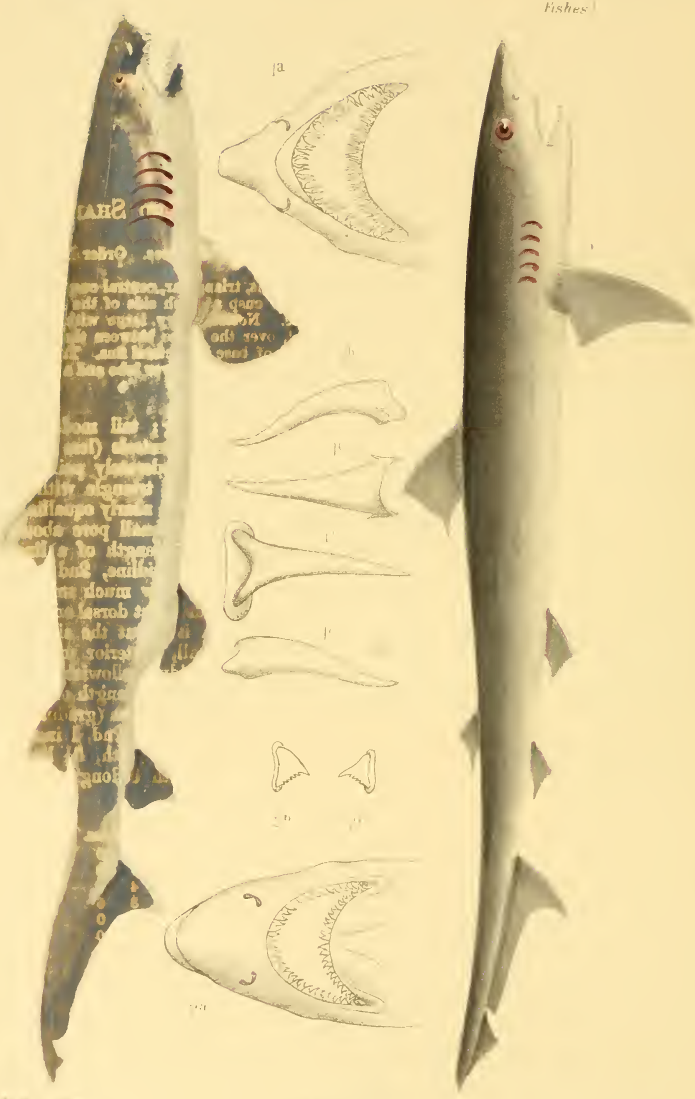
Frederick McCoy.

MEMOIRS OF THE MUSEUM

Pl.

ZOOLOGY OF VICTORIA

Fishes



F. Schönfeld del.

Prof. McCoy direxᵗ

Hamel & Cᵒ imp.

PLATE 64, FIG. 1.

ODONTASPIS TAURUS (RAFIN.).

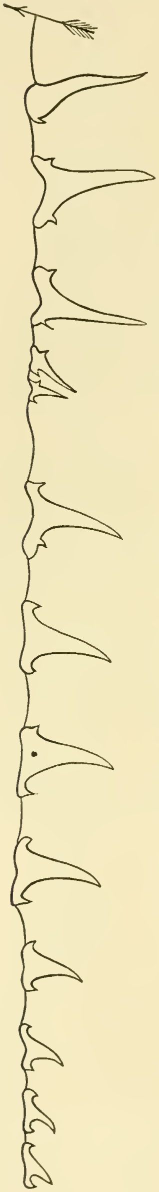
THE LONG-TOOTHED BULL-SHARK, OR SHOVEL-NOSED SHARK.

[Genus ODONTASPIS (AGASS.). (Sub-kingd. Vertebrata. Class Pisces. Order Plagiostomata. Sub-order Selachoidæ. Fam. Odontaspidæ.)

Gen. Char.—Teeth alike in both jaws, with smooth margins, triangular, central cusp thick, twisted, very acutely pointed, with a much smaller pointed cusp at each side of the deeply notched base; no median tooth. Spiracles very minute. Nostrils very large with large triangular valve. Second dorsal fin large, in front of anal, over the space between the large anal and the ventral fins. Branchial slits large, all in front of base of pectoral fins. Tail-pits very small or none; no keel on sides of tail. Caudal fin with a small lower lobe and a notch near end of slender upper lobe. No nictitating membrane.]

DESCRIPTION.—General form rounded, moderately tapering; tail moderate. Posterior border of 1st dorsal nearly over the origin of the ventrals (less than one-fourth the length of its base in front). Snout flat, moderately pointed, the portion in front of the eyes forming nearly an equilateral triangle with a transverse line drawn in front of eyes; the part in front of mouth nearly equalling one-half the width of the mouth in length. Spiracle a very small pore about midway between angle of mouth and top of orbit, and half the length of a line connecting them, behind. A moderate tooth on each side of midline, 2nd and 3rd a little larger; 4th and 5th teeth on each side in upper jaw much smaller than the adjoining ones. Pectorals nearly twice as long as wide. 1st dorsal ending over origin of ventrals, little larger than 2nd dorsal, which is about the size of the anal, and terminates nearly over its origin. Scales small, posterior margin rounded, each with three small keels. *Color:* Plain, muddy, yellowish grey above, lighter below; border of fins darker. Upper jaw: 13 teeth; length of 1st, 9 lines; 2nd and 3rd, 8 lines; 4th, 4 lines; 5th, 3 lines; 6th, 7½ lines (gradually diminishing to end). Lower jaw: 17 teeth; length of 1st, 7 lines; 2nd, 1 inch; 3rd, 1 inch 1 line; 4th, 1 inch 1 line; 5th, 6½ lines; 6th, 6½ lines; 7th, 5½ lines (thence regularly diminishing). 14 scales in 3 lines, each with 3 longitudinal keels.

Measurements.	Ft.	ins.	lines.
Length from tip of snout to tip of tail	9	11	0
„ „ „ anterior edge of orbit ...	0	7	0
„ „ „ „ 1st dorsal ...	4	4	6
„ „ „ „ 2nd dorsal ...	6	3	6
„ „ „ „ 1st gill-opening	1	8	0
„ „ „ „ pectoral ...	2	7	0
„ „ „ „ ventral ...	5	4	0
„ „ „ „ anal ...	7	6	0
„ „ „ „ caudal ...	7	11	0
„ „ „ nostril	0	4	0
„ of pectoral	1	4	0
Width of ditto	0	9	9
Length of nostril	0	1	3
Girth of body behind pectorals	4	4	0



Teeth of one side of upper jaw, natural size, to show the 4th and 5th small teeth. The arrow marks the middle of the front.

Measurements.	Ft.	ins.	lines.
Length of base of 1st dorsal	0	6	6
Height of ditto	0	6	3
Length of base of ventral	0	9	0
Height of ditto	0	8	0
Depth of first lobe of candal fin ...	0	10	0
Length from anterior edge of 1st lobe to notch of caudal	1	10	6
Diameter of eye	0	1	0
Width between middle of eyes	0	7	0
Length from tip of snout to spiracle ...	0	11	0
„ of projection of snout	0	2	0

REFERENCE.—*Carcharius taurus* (Rafinesque), Caratt. p. 10, t. 14., f. 1; *Odontaspis id* (Müller and Henle), Plagiostom. p. 73, t. 30.

This is one of the largest and most ferocious of our Sharks, and so common as to be an object of great terror to bathers, who occasionally suffer grievous lacerations when caught swimming even near the shore, towards which this species approaches into unusually shallow water.

The common name of Shovel-nosed Shark is given by the bay fishermen often to this species from the outline of the head, seen from above, being like the point of an unworn American or paddocking shovel in size and shape.

Enormous jaws of this species may often be seen in the fishermen's huts along the shore from Picnic Point to Mordialloc, and are easily known by the length and slenderness of the teeth, which are very numerous, about an inch long, and set in three or four rows on the under jaw, and two rows on the upper one, making a fearful armature of spikes, the lacerated wound produced by which is almost always fatal. One or two small teeth are remarkable as intervening between the third and fourth large ones on each side.

It is a very active and voracious species, driving shoals of fish before it in terror as it dashes along; and it is one of those which will occasionally dart out of the water at a piece of meat, or the oar of a boat, or a man's arm or leg.

The great quantity of fish fit for the table devoured by this species induced the Government a few years ago to place large sums on the estimates to prevent its increase, by offering a reward to the fishermen for each one killed according to its size; and for want of authentic figures of the different species to refer to, the authorities were ludicrously imposed upon by the fishermen bringing myriads of the harmless little blunt-toothed Dog-fish and other small species of Sharks, which they gravely presented as the young of this gigantic one, and got paid for, at so much a foot, to the amount of many hundreds of pounds.

Its geographical range is very great, extending to the Cape of Good Hope and to the American coast, where individuals are often found to have remains of men and clothing in them when cut up; and it is the commonest of the large sharks seen swimming round our bathing enclosures in Hobson's Bay.

Explanation of Figures.

Plate 64.—Fig. 1, side view of female, reduced. Fig. 1*a*, snout and mouth, viewed from below. Fig. 1*b*, side view of tooth, natural size, to show the double curvature. Fig. 1*c*, front view of same, to show basal cusps.

Plate 64, Fig. 2.

GALEUS AUSTRALIS (Macleay).

Australian Tope Shark.

[Genus GALEUS (Cuv.). (Sub-kingd. Vertebrata. Class Pisces. Order Plagiostomata. Sub-order Selachoidea. Fam. Galeidæ.)

Gen. Char.—Head flattened, muzzle pointed, rounded; eye with nictitating membrane, pupil round above, pointed below; nostrils with small triangular valve; a slit and fold of skin round angle of mouth. Tail moderately short, without pit at the base, or keel on the sides; upper lobe of caudal fin with a notch near tip. Anterior dorsal over interval between pectorals and ventrals, twice the size of second dorsal, which equals the anal in size, and is a little in front of it. Scales minute, with three slight keels. Teeth in both jaws flattened, triangular, notched behind, obliquely inclined backwards and outwards, inner edge smooth, sometimes with one denticle at base, middle cusp acutely angular, pointed, posterior or outer edge denticulated; teeth of middle of front of mouth as large as the lateral ones, but straight, with a denticle at each side of base. Spiracles behind the eye, longitudinal, oval, small. Intestinal valve spiral. Cosmopolitan.]

Description.—Fusiform, slender; snout long, semielliptically rounded; nape of nostril long and slender; teeth, about 19 on each side above and below; central cusp of teeth narrow, pointed, very obliquely inclined, with four to six serratures on posterior base; middle tooth straight, with one small cusp on each side of base. Small specimens have upper teeth less acute, and no serratures on the lower teeth. Second dorsal less than half the size of the first, commencing about one-third of the length of its base in front of front edge of anal; anterior edge of anal nearer to the anterior edge of caudal lobe than to posterior edge of base of ventral; pectorals broad, nearly rectangular at base, narrow towards tip; anterior edge of base vertically under posterior edge of penultimate gill-opening. Scales very minute, 20 in 3 lines about middle of body. Fold at angle of mouth continued above to under middle of eye; a fold on upper eyelid. *Color:* Back and upper half of side slate color; fins darker; lower side of snout, body, and tail white; iris yellow.

Measurements.	Ft.	Ins.	lines.
Length from tip of snout to end of tail	5	0	0
„ „ nostril	0	3	3
„ „ front of mouth	0	4	6
„ „ angle of mouth	0	7	0
„ „ front edge of eye	0	5	0
„ „ first gill-opening	0	10	6
„ „ anterior base of pectoral ...	1	1	6
„ „ posterior base of pectoral ...	1	4	0
„ „ anterior base of 1st dorsal ...	1	8	3
„ „ posterior edge of base of 1st dorsal	2	1	0
„ „ anterior base of ventrals ...	2	7	0
„ „ anterior base of 2nd dorsal ...	3	4	0
„ „ anterior base of anal... ...	3	4	7
„ „ anterior base of lower lobe of caudal	3	11	0
„ „ middle of notch of caudal ...	4	5	6
Longitudinal diameter of eye	0	1	3
Posterior edge of eye to spiracle	0	0	10
Length of spiracle	0	0	2
Length of front edge of pectoral	0	8	3
„ hind edge of pectoral	0	2	9
Greatest width of pectoral	0	4	9
Anterior edge of 1st dorsal	0	5	3
Posterior edge of 1st dorsal	0	1	6
Upper margin of 1st dorsal	0	4	6
Length of base of 1st dorsal	0	4	9
Anterior edge of ventral	0	2	6
End margin of ventral	0	2	9
Posterior margin of ventral	0	1	7
Length of base of ventral	0	2	7
Anterior margin of 2nd dorsal	0	1	10
Length of base of 2nd dorsal	0	3	0
Posterior lobe of 2nd dorsal	0	1	5
End margin of 2nd dorsal	0	2	3
Anterior margin of anal	0	1	6
Length of base of anal	0	2	0
Posterior lobe of anal	0	1	3
End margin of anal	0	2	1
Anterior lobe of caudal	0	6	0
Length of caudal	1	0	0
Width of mouth	0	5	0
Length of nostril	0	0	9
Length of middle gill-opening	0	1	6
„ base of upper teeth at middle of jaws	0	0	3½
Height of principal cusp	0	0	3

Reference.—Macleay, Desc. Cat. Aust. Fish, vol. 2, p. 290.

In size, general character, and coloring, this is closely related to the English Tope, *Galeus canis*, in which, as in the present species, I find, on comparing examples of the Australian and English fish, that the two hinder gill-openings are behind the anterior margin of the pectoral. The pectoral is much longer, broader, more falcate, and placed farther back in the English *G. canis* than in the Australian Tope. The 1st dorsal of the Australian fish is more near to the pectoral, and the pectoral and hind lobe of the caudal and the 1st dorsal are smaller, and the 2nd dorsal and anal in the Australian fish are not so close to the caudal ; the caudal being much larger in the English species than in its Australian representative. To render some of these comparative differences more clear, I give the relations in a tabular form of some of the measurements of the two species, taking the total length in each case as 100. The length of B was 5 feet ; it had lower and upper teeth serrated. The smaller male noted below, marked C, was 4 feet 7 in. 9 lines long ; serratures on lower teeth. D, a female, 4 feet 5 in. 6 lines long :—

Proportional Measurements of one English and three Australian Topes.	A.	B.	C.	D.
	English G. canis.	Australian G. Australis.		
	Young Female.	LargeFemale.	Small Male.	Small Female.
Total length from tip of snout to tip of tail ...	100	100	100	100
From tip of snout to anterior base of pectoral ...	27	22	18	17
„ „ posterior base of pectoral...	34	26	23	21
Length of pectoral	19	14	13	12
Greatest width of pectoral	8	7	7	7
From tip of snout to anterior base of 1st dorsal...	35	33	32	33
„ „ hind edge of base of 1st dorsal	41	42	41	42
Anterior edge of 1st dorsal	12	8	9	8
Length of base of 1st dorsal	9	8	8	8
From tip of snout to anterior base of ventrals ...	54	51	51	47
„ „ base of 2nd dorsal ...	62	66	67	68
„ „ base of anal	62	67	71	70
„ „ base of lower lobe of caudal	71	77	81	83
Length of caudal	27	20	17	17

This is a common Dog-fish in Hobson's Bay, usually from four to five feet long, of a graceful tapering form, with a long, semielliptical snout, small fins, except the upper lobe of the caudal, which is large, and with a distinct notch on its under margin. It is one of those having a transversely moving or winking eyelid, rising over two-thirds of the eye-ball from the inner corner of the oval eye.

The young when brought forth are about 1 foot long, from thirty to fifty being found in a single female. At this size the unabsorbed portion of the egg, 1 inch in diameter, hangs from them. It is a very interesting sight to see, in summer, the whole band of twenty or thirty little ones swimming about after, and generally under the parent, with an obvious display of mutual affection which is not looked for in fish which are not viviparous like this.

Like the English Tope (which has thirty or forty young twice a year), this is a most prolific Dog-fish, and is so abundant and so voracious for its size as to seriously affect the supply of the smaller sorts of fish, and is much hated by the fishermen accordingly. It is exceedingly active, and has the same habit as its European representative of swiftly rolling the line round its body when hooked, coming thus to the surface. It is more frequently caught by persons fishing with a line from the end of the piers for Flatheads than the latter.

This species has not been figured before.

Explanation of Figures.

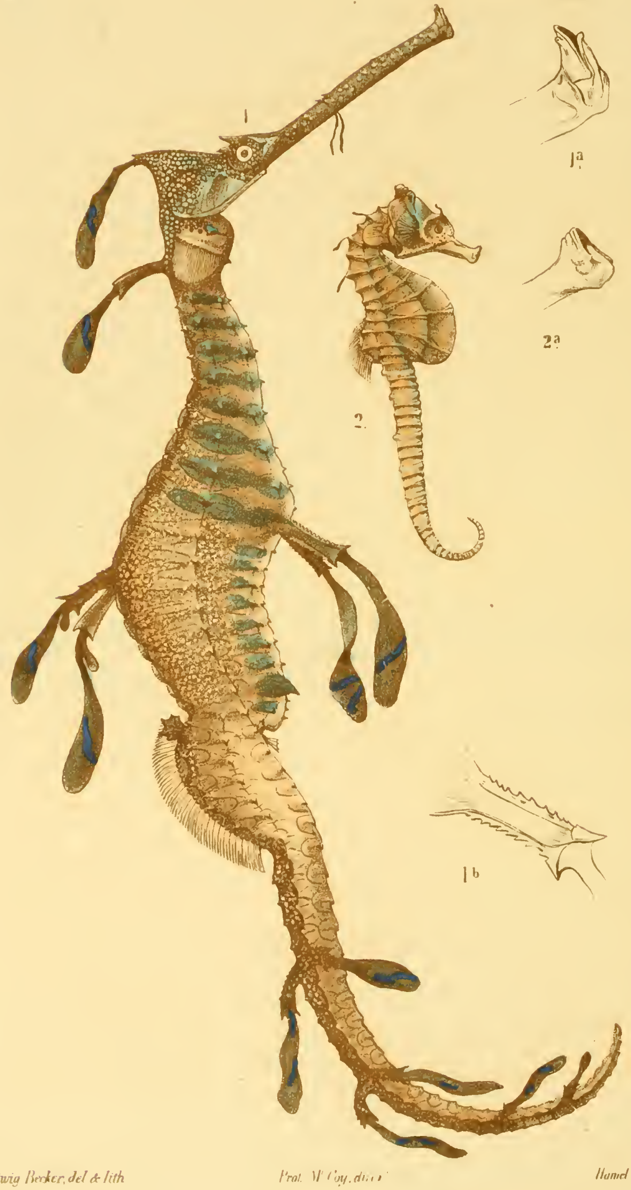
Plate 64.—Fig. 2, profile view of female, reduced. Fig. 2*a*, under side of head to show form of snout, mouth, and nostrils. Fig. 2*b*, upper lateral tooth, natural size (most of the teeth in old specimens have the cusp longer and narrower, with a more marked notch between it and the serrated base than in the figured example). Fig. 2*c*, lower lateral tooth, natural size.

Frederick McCoy.

MEMOIRS OF THE MUSEUM

Pl. 63

ZOOLOGY OF VICTORIA
(Fishes)



Ludwig Becker, del & lith *Prof. McCoy, direx* *Hamel & Co. imp*

PLATE 65, FIG. 1.

PHYLLOPTERYX FOLIATUS (SHAW SP.).

THE LEAFY SEA-DRAGON.

[Genus PHYLLOPTERYX (SWAINSON). (Sub-kingd. Vertebrata. Class Pisces. Order Lophobranchiata. Fam. Syngnathidæ.)

Gen. Char.—Body elongate, fusiform, much compressed, the back convexly arched to opposite anal, and then forming a second dorsal convexity on tail from base of dorsal fin ; the belly slightly concave ; neck-like, anterior portion long and slender ; head with a high compressed occiput suddenly narrowing to the large orbit, beyond which is a long, more slender, tubular snout, with the small jaws at the extremity directed obliquely upwards and forwards ; tail long, slender, gradually tapering to a pointed posterior end, which is not prehensile. Pectoral fin short, rounded ; anal fin very minute ; no caudal fin ; dorsal fin moderate. Flat spinulose bones, bearing flat, ovate, leaf-like skinny appendages, arise from occiput nape, a pair from middle of belly, and pairs at intervals on back of tail. Australia.]

DESCRIPTION.—Head about 4⅓ to 4¾ in the total length ; from hind edge of operculum to posterior edge of orbit one-fourth the length from hind edge of operculum to tip of snout; height of head at occiput about 3½ in total length of head; depth of tubular snout two-thirds the diameter of orbit; two strong spines diverge upwards, outwards, and backwards from posterior half of upper edge of orbit, and one directed outwards on each side in front of orbit; two minute spines on upper edge of snout, considerably nearer to the eye than the tip, and two slender filaments (often united) on under opposite side. Surface of operculum and preoperculum with fine radiating ridges; pectoral region behind operculum swollen conically, and with a lateral spine on each side and several smaller ones below. Vertical skin-plates, 18 on body and 36 on tail, each with small spinulose tubercles at upper and lower ends, except the upper ends of the 6th to the 17th, which are obtusely rounded and covered with spinous granules; body rings with a nearly median lateral row of small, conical tubercles running into the lower caudal line at origin of tail; a similar median row begins on penultimate body segment, and continues on those of tail rather above the middle to end of dorsal fin, when it forms the upper caudal row. The leaf-bearing long spinulose bones are one short one on occiput, one twice as long on nape, a pair still larger on 11th body ring, and from the 11th, 17th, 23rd, and a single one on the 27th segment of tail; and from the ventral edge of the 9th body segment a short pair with leafy appendages like those above; a much shorter and broader pair without leafy appendages, but ending in several small spines, on dorsal edge of the 1st caudal segment, and a similar pair on abdominal edge of penultimate body segment. *Color:* (of figured specimen) of a greyish orange-fawn color, with minute round yellowish-white spots (most conspicuous on head); head and snout darker. The 9 first body segment have each a broad, vertical, ovate blue patch, extending from above the middle to the ventral edge, the remaining body rings having much smaller ones close to ventral edge; iris silvery-white or yellow; leafy appendages dark olive-brown, with blue patches and reflections. *Fin-rays:* dorsal, 32; anal, 4; pectoral, 21 (the dorsal stands on last body plate, and six first caudal plates). Length, 14 inches; from tip of snout to front edge of orbit, 2 inches 1 line; diameter of orbit, 4 lines ; from tip of snout to hind edge of operculum, 3 inches; to middle of base of pectoral, 3 inches 5 lines; to base of tail, 7 inches 7 lines; greatest depth of body, 1 inch 4 lines; greatest depth in front of middle of snout, 2 lines; at base of tail, 8 lines; from tip of snout to origin of dorsal fin, 7 inches 5 lines; length of dorsal, 1 inch 7 lines; greatest length about middle of dorsal, 5 lines.

Reference.—*Syngnathus foliatus* (Shaw), Gen. Zool., vol. 5, t. 180; = *S. tæniolatus* (Lacep.), Ann. du Mus., v. 4, t. 58, f. 3. *Phyllopteryx foliatus* (Swains.), Nat. Hist. Fish., v. 2, p. 332.

This most singular-looking Fish must have struck the aborigines with some superstitious feeling, as I have seen a native drawing of a ghost, manifestly inspired by its strange form. The leafy appendages resemble bits of brown seaweed, and vary slightly, frequently showing a rich blue color. The above dull colors are those I have seen in one living specimen, and several just dead and quite fresh. The brilliantly colored fish represented in the Zoological Proceedings for 1865, plate 14, and in Mrs. Meredith's "Tasmanian Friends and Foes," plate 7, with yellow, crimson, and purple hues, is really a distinct species, for which I propose the name *P. altus*, because the greatest height or depth of the body exceeds the length of the snout from anterior edge of orbit, and equals about ten of the posterior body segments, or mid-row of spines in front of anal, while the greatest depth of the body in our common Victorian dull-colored species, as here figured, and as also in Shaw's original figure of the species, is scarcely $\frac{3}{4}$th the length of the snout, and only measures about 7 of the lateral spines of the hinder body segments in front of the anal.

Like the Pipe-fishes, the males of this fish carry the eggs in a soft membrane on the lower side of the tail, without, however, having a distinct pouch like the males of the true Pipe-fishes. Dr. Kaup, who has carefully examined all the specimens of this fish in the Paris Museum, is able to state that none of these have the snout so short as in Lacepede's figure above quoted, which is therefore simply incorrect in this particular. I do not think the end of the tail is prehensile; at least in newly dead specimens it is not spirally inrolled as in *Hippocampus.*

The Sea-dragons swim horizontally, like ordinary fish, and not in a vertical position, like the Sea-horses.

Common at Western Port, not very uncommon in Hobson's Bay, and Geelong and Portland, from all of which localities specimens are in the National Museum.

Explanation of Figures.

Plate 65.—Fig. 1, moderate specimen, natural size (tip of tail broken). Fig. 1*a*, jaws at end of snout, magnified 2½ times. Fig. 1*b*, one of ventral bony leaf-bearers, magnified 2½ diameters.

PLATE 65, FIG. 2.

HIPPOCAMPUS BREVICEPS (PETERS).

SHORT-HEADED SEA-HORSE.

[Genus HIPPOCAMPUS (LEACH). (Sub-kingd. Vertebrata. Class Pisces. Order Lophobranchiata. Fam. Syngnathidæ.)

Gen. Char.—Head and body shaped like head and neck of a horse ; tail abruptly narrowed, slender, spirally inrolled at tip, prehensile and without caudal fin. Head compressed, broad behind, the upper posterior angle raised with a spinose knob or coronet ; orbits large, spiny ; snout abruptly narrowed beyond the orbit, with very small, terminal, nearly vertical jaws ; body heptagonal, of 10 to 12 bony shields, with spinose tubercles. Pectoral and dorsal fins moderate, anal fin present in female, very small. Males carry the eggs in a pouch at base of tail. All temperate and tropical seas.]

DESCRIPTION.—Head short, snout $1\frac{1}{2}$ times diameter of orbit, or from tip to front edge of orbit equal in length to space from posterior edge of orbit to the hind edge of operculum, or from tip to hind edge of orbit equal to from same point to base of pectoral; spine over each orbit large, triangular, nearly vertical, inclining slightly outward, with a short filament at apex; a filament in front of base of coronet; height of coronet equal depth of middle of snout, or two-thirds the diameter of orbit, having 5 conical tubercles at apex, with small filaments ; one large triangular spine on middle of throat vertically under hind edge of orbit, with a smaller one on each side on ridges diverging backwards from it, on lower edge of gill-cover, a little in front of hind edge of operculum ; operculum radiatingly ridged. Body rings, 11, the upper tubercles of the 1st, 3rd, and 5th larger and with a filament on each side, the three last elevated into a convex base for dorsal fin ; midline of body tubercles (1st, 3rd, 5th, 8th, 9th and 10th, most prominent) continuous with lower ridge of tail ; tail quadrangular, of about 39 rings, the 4th, 7th, and 10th more prominent above than the others. Dorsal fin on three last rings of body and between one and two first of tail, of 20 rays; pectoral rounded, of 14 rays, anal in female of 4 rays. *Color:* ashy yellowish-grey, with bluish reflections, minutely dotted with dark-red; body with numerous, minute, dark-edged, round, white spots; operculum and snout spotted with brown, and rays of same color round eye; iris yellow; tail ringed with brown and yellow. Height at penultimate body rings equalling the length of the nine last body rings together. Length, about $2\frac{1}{2}$ inches, of which the tail is one-half.

REFERENCE.—Monatsbericht Akad. Wissensch., Berlin, 1869, p. 710.

The extraordinary resemblance to a horse's head and neck has suggested the popular name of Sea-horse for these beautiful little fishes in all European countries ; the common South of Europe species being the 'Ιππόκαμπος of Ælian.

They are the most lovely and interesting objects in an aquarium. In swimming they maintain an erect position, very unlike other fish. Fixing themselves to a stem of swaying seaweed by their inrolled prehensile tails, they maintain an upright watchful attitude, balancing themselves by their pectoral fins, and rolling their bright, prominent, yellow eyes about in all directions, one often directed forwards and the other backwards, like the chameleon.

Like all the family *Syngnathidæ*, or Pipe-fishes, the males carry the eggs about for a period in a sac along the under surface of the tail—a marsupial habit "with a difference," as far as the sex is concerned, of a curiously suggestive kind, as to why the males should not in other creatures have the trouble of protecting the young instead of the almost universal arrangement of leaving it to the females.

This little species is common in Hobson's Bay, but has not been figured before.

EXPLANATION OF FIGURES.

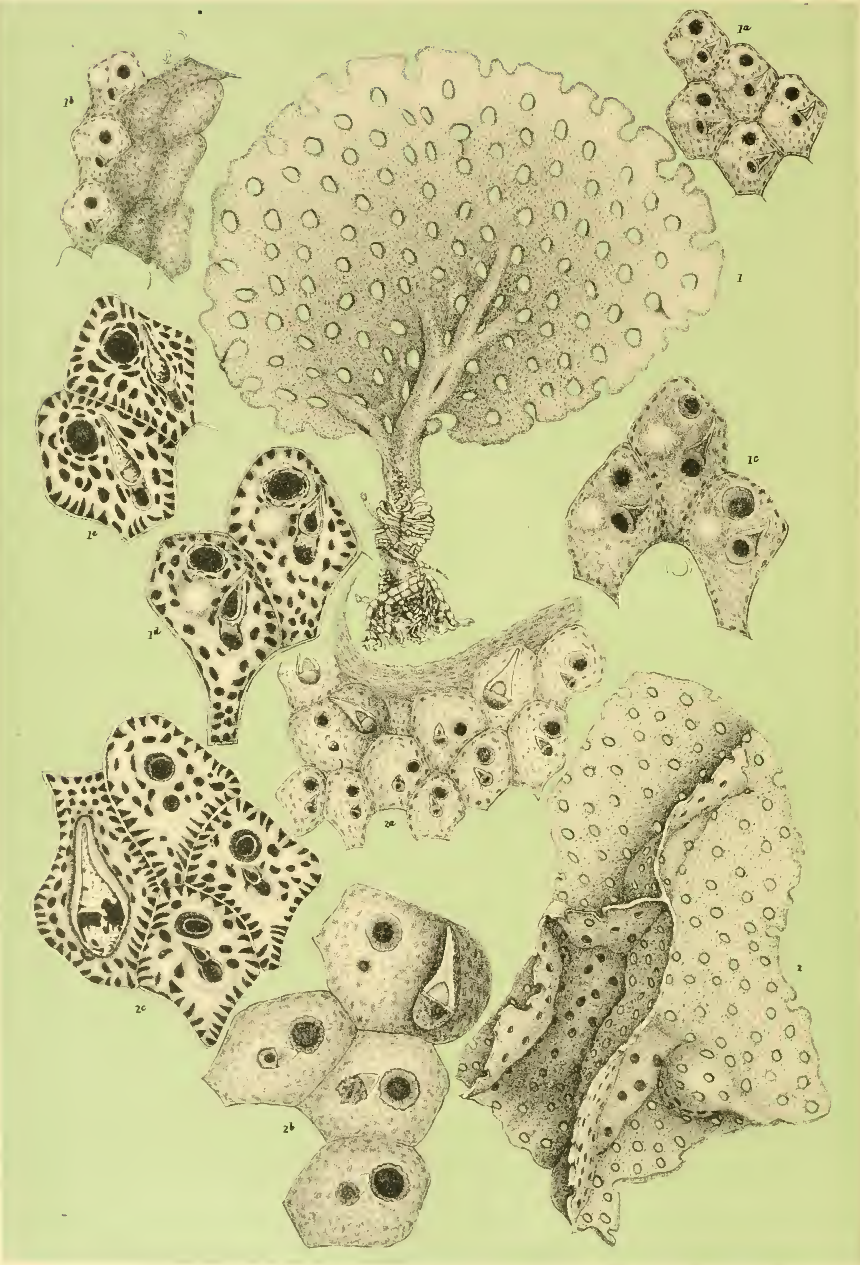
PLATE 65.—Fig. 2, large specimen, natural size. Fig. 2*a*, tip of snout, magnified 3 diameters, to show the little terminal jaws.

FREDERICK McCOY.

64

Dictyopama

(Polyzoa)



J Ripper del et lith.

Prof Mc Coy dirext

Steam litho Govt. Printing Office

PLATE 66, FIG. 1.

DICTYOPORA GRISEA (LAMX.).

[Genus DICTYOPORA (P. McG.). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Fam. Escharidæ.)

Gen. Char.—Polyzoary, stony, expanded, foliaceous, fenestrate, articulated by a flexible stem; cells horizontal, opening on both sides; a special pore on the front of each, close to which is an avicularium.]

DESCRIPTION.—Polyzoary fan-shaped, flat, occasionally proliferous; fenestræ large, nearly circular, the marginal rim divided into distinct pitted nodules; cells rounded above, attenuated below; mouth rather small, circular or nearly so, the margin somewhat thickened; a wart-like projection below and to one side of the mouth; surface, except on the summit of the elevation, pitted; a round pore near the middle of the cell, close to which is an avicularium of moderate size, the triangular mandible turned obliquely outwards to the side opposite the wart-like projection.

REFERENCES.—*Adeona grisea*, Lamouroux, Exposition Methodique, p. 40, t. 70, fig. 5; Kirchenpauer, Ueber die Bryozoen-Gattung Adeona, p. 9, t. I., fig. 8, 8*a*.

Port Phillip Heads.

Of this species I have examined two perfect specimens, the one figured, dredged by Mr. Wilson, and the other by myself, in about 12 fathoms. In both the frond or plate is quite flat, not being twisted or contorted in any way, and extends more to one side of the stem. In the figured specimen it is 3½ by 2¾ inches, and in the other 4 by 3. The flexible stem in one is 1 inch by ⅜ths at the widest part, in the other about 1½ by ¼th. In both it terminates in a number of small radicles presenting the same structure as the main stem, by which they are fixed to the calcareous nodules on which they are growing. Raised branching processes or ribs extend for a considerable distance up the plate. The fenestræ are regularly placed, nearly circular or elliptical, 2–3 mm. in diameter, the intervening spaces 3–5 mm. The margins of the fenestræ, as in *D. cellulosa*, are divided into nodules resembling abortive cells.

D. grisea may be distinguished from *D. cellulosa*, to which in the structure of the cells it is closely allied, by the simple flabellate frond (said by Kirchenpauer to be sometimes proliferous), by the avicularium being shorter and directed obliquely across the front of the cell, not, as in the latter, extending upwards beyond the level of the mouth, and by the wart-like elevation which is especially marked in incinerated specimens.

EXPLANATION OF FIGURES.

Fig. 1, specimen, natural size. Fig. 1*a*, group of cells, magnified. Fig. 1*b*, margin of fenestra, magnified. Fig. 1*c*, three cells, more highly magnified. Fig. 1*d*, two cells, to show the pattern after incineration. Fig. 1*e*, two cells of *D. cellulosa*, similarly treated.

PLATE 66, FIG. 2.

DICTYOPORA ALBIDA (KIRCHENPAUER).

VAR. AVICULARIS (P. McGIL.).

DESCRIPTION.—Polyzoary expanded, proliferous and cavernous; fenestræ regular, nearly circular, margin forming a continuous punctate rim; cells expanded and arched above, narrowed below, surface pitted, the pits forming a regular row just inside the margin; surface raised round the mouth, which is nearly circular; a round pore a short distance below, to the side of which is frequently attached a minute, triangular avicularium, with the mandible pointed obliquely upwards; several large avicularia, replacing cells, situated round the margins of the fenestræ.

REFERENCE.—P. H. MacGillivray, Trans. Roy. Soc. Vict., 1881.

Port Phillip Heads, first found by Mr. J. B. Wilson.

This, I believe, to be a form of Dr. Kirchenpauer's *D. albida*. It attains a very large size, one specimen, dredged in 15 fathoms, measuring over 30 inches in circumference. The plate is proliferous, and united in various ways so as to form chambers or caverns like those of *D. cellulosa*, but usually of larger size. On one specimen a broad, white, irregular rib extends up the plate. The color is ash-grey; the margins of the fenestræ white. The fenestræ are about 2mm in diameter, and the interspaces about 3mm wide. The cells resemble those of *D. Wilsoni*, but they are broader and more regularly trapezoid; the special pore is also smaller, the surface is not so much raised on each side, and the puncturation is deeper and larger. These characters are more prominently shown in incinerated specimens. It also differs in the cavernous arrangement of the plate, in its lighter color and greater thickness. This and *D. Wilsoni* are at once distinguished from *D. cellulosa* and *grisea* by the small size of the avicularium and the smooth margins of fenestræ.

Explanation of Figures.

Fig. 2,—specimen, natural size. Fig. 2*a*, margin of fenestra and group of cells, with three large cell-replacing avicularia, magnified. Fig. 2*b*, cells from same group, more highly magnified, showing three with avicularia, one with simple pore, and a large cell-replacing avicularium. Fig. 2*c*, group of cells and large avicularium, incinerated.

The specimens were presented by Mr. J. B. Wilson, and the descriptions by Mr. MacGillivray.

Frederick McCoy.

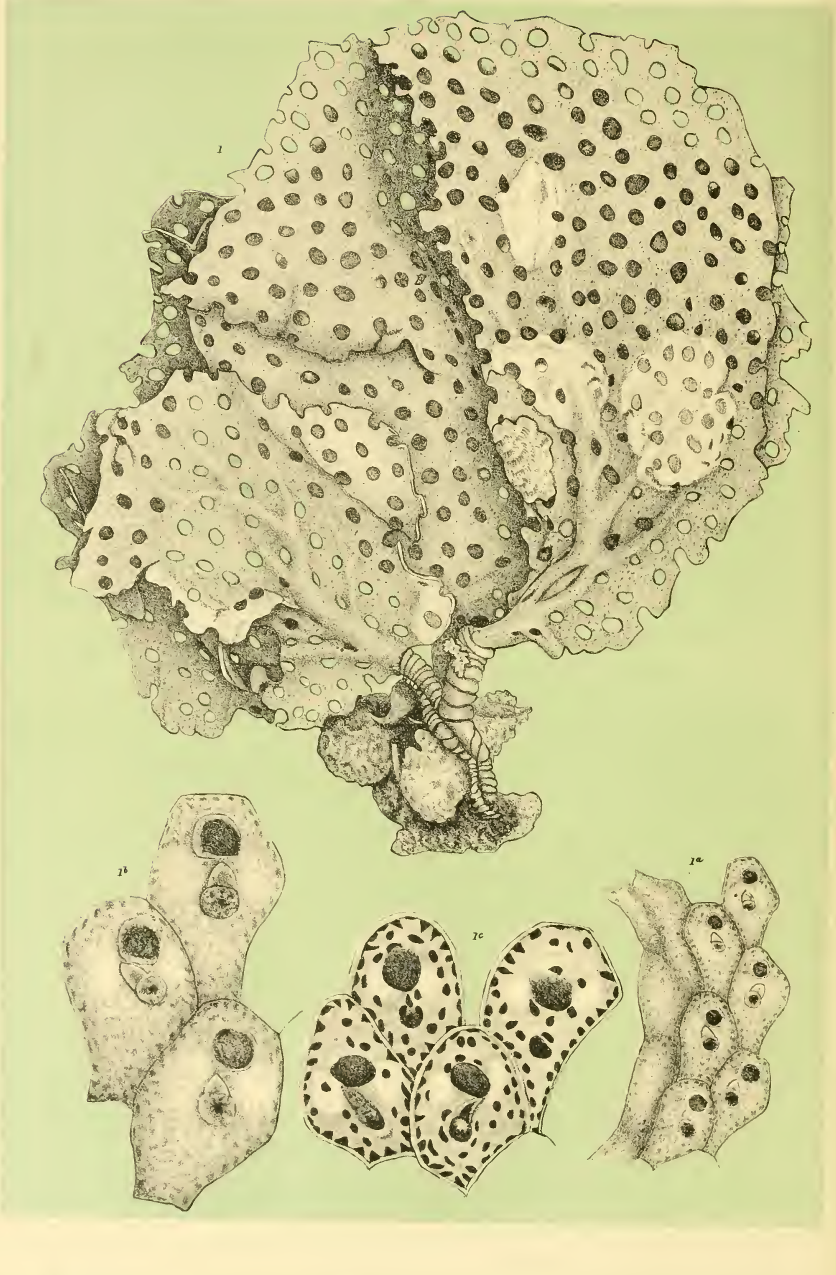
67

Dictyopora

Pl.67

ZOOLOGY OF VICTORIA

(Polyzoa)



Ripper del et lith

Prof Mc Coy direxᵗ

Steam litho, Govt. Printing Office

PLATE 67,

DICTYOPORA WILSONI (P. McGIL.).

DESCRIPTION.—Polyzoary thin, fan-shaped, somewhat contorted, simple or proliferous; fenestræ variable in size, circular or elliptical, the marginal rim nearly plain and not divided into nodules; cells broad and more or less rounded above, much attenuated below; surface obscurely pitted and raised on each side of the avicularian pore (frequently more so on one side) and towards the sides of the mouth; mouth circular or nearly so; about the middle of the cell there is a round pore with a small avicularium (frequently absent) with the triangular mandible directed obliquely upwards.

REFERENCE.—P. H. MacGillivray, Tr. Roy. Soc. Vict., 1881.

Port Phillip Heads, Mr. J. B. Wilson.

I have only seen one specimen of this species. It consists of a tuft of four separate plates, the stems arising from the same basis. The plates are thin, fan-shaped, somewhat contorted, about 4 inches high and the broadest about the same width. The separate flexible stems are up to 1 inch long, and from $\frac{1}{8}$ to a $\frac{1}{4}$ inch wide. To one of the plates there is a secondary plate attached at an acute angle, and in another there are several plates so arranged as to form two compartments, one very small, the other 2 inches deep, $\frac{1}{2}$ inch wide in one direction and $1\frac{1}{4}$ in the other at the orifice. In all, slightly raised ridges extend, dividing from the stem to a variable distance up the plate. The fenestræ are from 1 to 3 mm wide, the intervening spaces, about 4 mm. The cells resemble those of Kirchenpauer's *Adeona arborescens*, which I have not seen. That species, however, seems to be sufficiently distinguished by the thick, prominent ridges or ribs which extend regularly for a long distance on the plate, while in *D. Wilsoni* they are short and very slightly elevated.

EXPLANATION OF FIGURES.

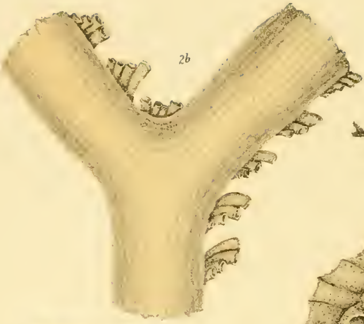
PLATE 67.—Fig. 1, specimen, natural size. Fig. 1*a*, margin of fenestra, with contiguous cells, magnified. Fig. 1*b*, three cells, more highly magnified. Fig. 1*c*, group of cells incinerated.

The figured specimens of *Dictyopora* were presented by Mr. J. Bracebridge Wilson; for the description I am indebted to Mr. MacGillivray.

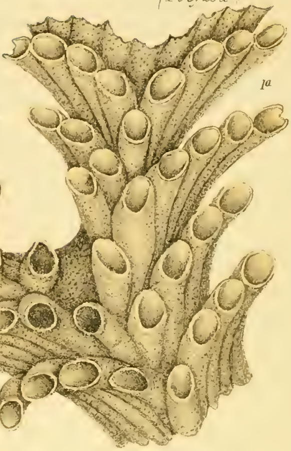
FREDERICK McCOY.

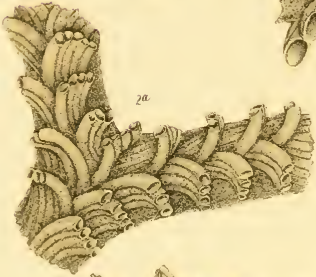
Idmonites

(Polyzoa.)

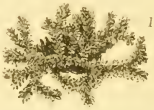

2b

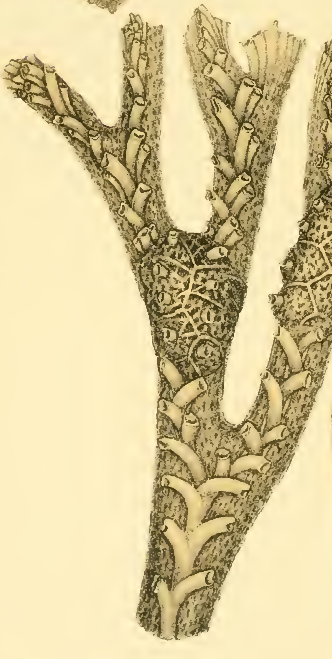
2

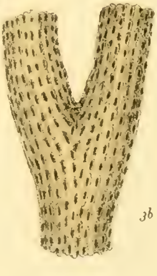

1a

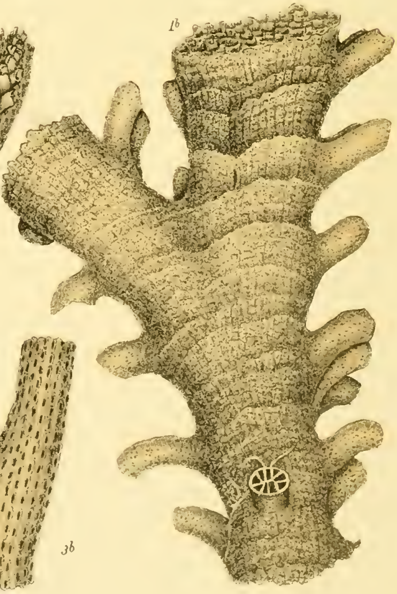

2a

3


1


3a


3b


1b

J. Ripper del et lith

Prof. M^{c} Coy direx^{t}

Steam litho Govt. Printing Office

PLATE 68, FIG. 1.

IDMONEA MILNEANA (D'ORBIGNY).

[Genus IDMONEA (LAMX.). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cyclostomata. Fam. Idmoneidæ.)

Gen. Char.—Polyzoary erect, branched. Cells tubular, arranged in parallel transverse or oblique rows on each side of the mesial line of the front of the branches.]

DESCRIPTION.—Polyzoary spreading more or less horizontally, branches broad, flat, dividing dichotomously ; cells usually four in a series, the outer the longest, surface closely punctate ; back of branches longitudinally grooved, finely punctate or perforated, and marked with transverse concentric ridges of growth.

REFERENCE.—Busk, Brit. Mus. Cat., pt. iii., p. 12, Plate xi.

Port Phillip Heads, 10–15 fathoms.

The largest specimen I have seen is the one figured. The polyzoary is green, 1 inch in one diameter by ¾ in the other. It springs from the surface of a Retepora and immediately branches horizontally and dichotomously. These branches send down from the back numerous calcareous radiciform processes which become attached to the Retepore. The branches are broad and flat behind. The cells are usually four in a series, the inner the least prominent, the others gradually increasing in length to the outer which projects very much. They are united side to side throughout almost their whole length, so as to form regular walls rising up and projecting far beyond the edges of the branches. They are distinct on the front of the branches and are minutely and closely punctate. The back of the branches is longitudinally sulcate, thickly covered with punctations which are usually opened and form small pores, and it is closely marked by nearly transverse, arched, concentric lines of growth. From various parts of the back of the branches calcareous radiciform processes project downwards, and are united to the body from which it grows ; these processes are sulcate and punctate, and in section are seen to be composed of a number of prismatic tubes.

EXPLANATION OF FIGURES.

PLATE 68.—Fig. 1, specimen, natural size. Fig. 1*a*, portion of front of same, magnified. Fig. 1*b*, portion of back, magnified, showing the longitudinal sulci, punctations, and transverse ridges.

PLATE 68, FIG. 2.

IDMONEA AUSTRALIS (P. McGIL.).

DESCRIPTION.—Polyzoary dichotomously branched, branches spreading irregularly, contorted, and twisted on themselves ; 4–6 cells in a series, the inner the longest, surface punctate ; back of branches longitudinally sulcate, the intervening ridges punctate.

Port Phillip Heads, 10–15 fathoms.

The only specimen I have with a distinct point of attachment is ½ inch high by ¾ across. Numerous others, evidently broken off close to their origin, are about the same size. The polyzoary is of a dirty-white color, dichotomously irregularly branched ; the branches angular in front, slender, frequently spreading in various directions and slightly twisted on themselves, occasionally a third of a revolution or even more. There are about 4–6 cells in a series, the inner the longest, the outer little projecting. The surface is finely punctured and obscurely granular. The back of the branches is rounded, deeply sulcate longitudinally, the ridges between the sulci punctate.

This species may prove to be a form of *I. Atlantica*, but at present I think it better to describe it as a distinct species.

EXPLANATION OF FIGURES.

PLATE 86.—Fig. 2, specimen, natural size. Fig. 2*a*, front of a branch, magnified. Fig. 2*b*, back, magnified.

PLATE 68, FIG. 3.

IDMONEA RADIANS (LAMK.).

DESCRIPTION.—Polyzoary rising from a narrow base ; branches narrow in front, dichotomous, spreading in a radiating manner ; cells 1–4 in a series, the inner very much projecting, smooth, mouth bilabiate ; back of branches ridged longitudinally, with the intervening sulci pierced by a single row of round or oval pores ; ovicells anterior, situated immediately below a bifurcation, and embracing the cells on both sides for about 5 series, divided by elevated ridges, and with the intermediate surface pitted.

REFERENCE.—Busk, Brit. Mus. Cat., pt. iii., p. 11., pl. vii., fig. 1–4.

Williamstown ; Queenscliffe ; Portland, Mr. Maplestone.

This beautiful species forms small masses up to $\frac{3}{4}$ inch in diameter. It is fixed to narrow algæ and other zoophytes by a small calcareous attachment usually encircling the stem. There are generally several primary branches which at once divide dichotomously and more or less horizontally, the bifurcations being repeated three or four times. The divisions of each primary branch are arranged in a fan-shape, and in fine specimens the whole polyzoary assumes a nearly circular outline. The branches are much narrowed in front, the proximal parts of the cells forming a prominent ridge. The number of cells in a series varies from 1 to 4. When more than one, the inner is very much longer, and when viewed in front may obscure the others (as in the figure). The mouth, in perfect specimens, is usually bilabiate. The back of the branches is deeply sulcate longitudinally, the spaces between the sulci forming continuous, rounded, smooth ridges. In the sulci there is a single series of roundish or oval foramina, placed at short distances and regular intervals. The ovicells are situated on the front of a branch immediately below a bifurcation. They are very large, embracing the cells of 4 or 5 series on each side, project forwards, and are traversed by reticulating slightly elevated ridges, the surface between which is deeply pitted.

EXPLANATION OF FIGURES.

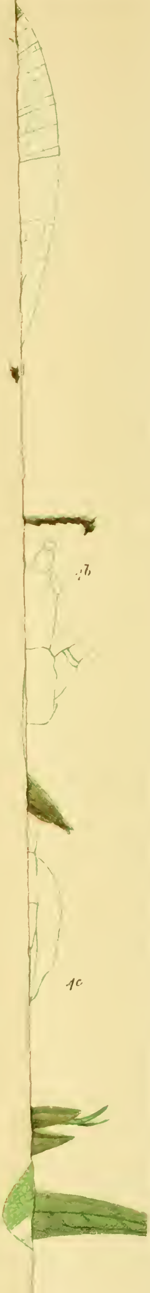
PLATE 68.—Fig. 3, specimen, natural size. Fig. 3*a*, front of portion magnified, showing also two ovicells. Fig. 3*b*, portion of back, magnified.

Mr. MacGillivray has presented all the type specimens figured on this plate, and the descriptions for the Museum and this work.

FREDERICK MCCOY.

69-72

Foldout Here



A B Printing Office

PLATES 69 AND 70, FIGS. 2 AND 3.

TROPIDODERUS IODOMUS (McCOY).

THE VIOLET-SHOULDERED PHASMA.

[Genus TROPIDODERUS (G. GRAY). (Sub-kingd. Articulata. Class Insecta. Order Orthoptera. Sec. Ambulatoria. Fam. Phasmidæ.)

Gen. Char.—Body large. Head flat, oblong, and subconvex behind in female. No ocelli. Antennæ 24-jointed and as long as entire thorax in males; 26-jointed and about as long as the mesothorax in female. Mesothorax in male slender, cylindrical, more than twice as long as prothorax, sides finely serrated; in females about twice as long as prothorax, subtriangular, keeled along the middle, sides sloping downwards and outwards to a prominent, flat, serrated margin; mesothorax similarly keeled in middle, and serrated at sides. Tegmina elongate, ovate, extending nearly to middle of first segment of abdomen in male, to middle of abdomen in female; median carina, moderately elevated in both sexes. Wings very large in both sexes, reaching nearly to end of abdomen, those of males narrower. Legs short; simple; basal joint of all the tarsi short; four posterior femora in male slender, strongly serrated on all the angles; in the female the fore margin dilated and dentated. Abdomen of male slender, cylindrical; of females broad, gradually tapering to tip; ovipositor large, boat-shaped, extending slightly beyond abdomen; anal styles are moderately long in both sexes.]

DESCRIPTION.—Female: *Color:* Tegmina and costal area of under wings bright pea-green above and below, except the base of the under-wings which are rich intense violet on upper and under sides; sides and lower surface of abdomen, head, thorax above and below, and femora a slightly duller green; tibiæ and tarsi and anal styles brownish; upper surface of abdomen pale-greenish yellow; veins of posterior part of lower wings pale-green; the hyaline membrane nearly colorless, or with a slight greenish hue. Serratures of sides of thorax and femora of two hinder pairs of legs reddish. Prothorax and mesothorax closely and irregularly granular above, the metathorax granulated like the others below, as well as lower side of abdomen; antennæ equalling the prothorax and mesothorax in length. Length from 4 inches 9 lines to 5 inches 3 lines: proportional measurements to length, taken as 100, length of head, $\frac{7}{100}$; of antennæ, $\frac{16}{100}$; of prothorax, $\frac{6}{100}$; mesothorax, $\frac{11}{100}$; metathorax, $\frac{16}{100}$; abdomen, $\frac{60}{100}$; width, $\frac{13}{100}$; ovipositor, $\frac{20}{100}$; anal styles, $\frac{5}{100}$; length of tegmina, $\frac{35}{100}$; width of tegmina, $\frac{12}{100}$; length of wing, $\frac{72}{100}$; greatest width of wing, $\frac{45}{100}$; width of costal area, $\frac{11}{100}$; length of anterior femora, $\frac{25}{100}$; width, $\frac{3}{100}$; length of 2nd femora, $\frac{19}{100}$; width, $\frac{5}{100}$; length of hind femora, $\frac{20}{100}$, width, $\frac{6}{100}$.

This splendid Phasma is an example of the gigantic insects peculiar to Australasia constituting the genus *Tropidoderus*, and it is a good type of the whole family of the *Phasmidæ*, popularly called Spectres, Walking-sticks, and Walking-leaf Insects, from so closely resembling twigs and foliage of plants frequented by them.

The 5-jointed tarsi, the longitudinally folded wings, and no pincer at end of abdomen, separate the *Phasmidæ* from the Earwigs (*Forficulidæ*); the small prothorax, from Cockroaches (*Blattidæ*); the simple fore legs, from the raptorial *Mantidæ;* and the hind legs not being thickened for leaping, from the saltatory Grasshoppers and Locusts (*Locustidæ*), the Crickets (*Achetidæ*) and *Gryllidæ.*

They are confined to warm latitudes ; the Indian Archipelago being their great centre. They are all harmless, plant-eating creatures. The males are smaller, and with longer and more slender legs and antennæ than the females. In some the males have large wings, and the females only imperfectly developed ones or none, while in others both sexes have fully-developed wings, and in many others the adults of both sexes are apterous. The legs when lost are gradually restored in successive moults ; but these renewed legs are generally smaller than before, and may be recognised by this difference from the corresponding one on the other side. The relative proportion of different parts of the legs and parts of the thorax afford specific characters; and the three terminal segments of the abdomen containing genital parts are also used for discriminating species. In the male the three last joints on the ventral side are smaller than the rest, and swollen ; in the females the 7th on the under side forms a boat-shaped ovipositor or operculum protecting the genital appendages of the two terminal joints, sometimes forming long, exserted styles or plates. In both sexes the under-side of the ninth dorsal segment has two, generally filiform, very short, setose styles, greatly developed in the Australian species into two long flattend appendages. The relative size of the two divisions of the metathorax above affords specific characters.

The family *Phasmidæ* is divided into the following sections, which are only temporary, as *Bacillæ* of the 1st may hereafter be found to have winged males. A difficulty also arises in the immature stages of development of the tegmina and wings of species, having them large when adult. The texture sometimes enabling one to distinguish small wings in adults, from immature small stage of large-winged species. The main vein of the costal area of the wing is simple in the male and forked in the female, or forked in both sexes. The ocelli are not even of sexual importance, some individuals having three, and others of the same sex and species not having any.

§ 1. *Apterophasmina.* Tegmina and wings absent in adults of both sexes.

§ 2. *Pterophasmina.* Tegmina and wings developed in both sexes, or in males only. Tegmina (except in *Phyllium*) too small to cover the wings, the anterior costal area of which is hard coriaceus, thick and colored, and with parallel, immovable veins, the hinder membranous part of the wing folding up longitudinally under it when at rest, from its movable radiating veins.

This beautiful species differs from *T. Childreni* in the less width of the tegmina, and the longitudinal veins in front of the median one being so small as scarcely to strike the eye, and in the less width of the costal area, and of the dilated middle of posterior femora.

One of the specimens figured was presented to the Museum by Prof. Halford, from Beaconsfield, on the Dandenong Range, the others are from near Melbourne. Although varying half an inch in absolute size, the proportional measurements given above are the same in all.

Explanation of Figures.

Plates 69 & 70.—Fig. 2, female with wings extended, natural size. Fig. 3, another specimen with wings closed, in the resting position, on a twig of *Eucalyptus*, to show the resemblance between the leaves and the hard parts of the wings when at rest.

Plates 69–70, Fig. 1.

TROPIDODERUS RHODOMUS (McCoy).

The Red-shouldered Phasma.

Description.—General form of *T. iodomus* but with longer wings, and with broader tegmina, having the veins on the anterior half or side of the mid-line nearly as strong as those below or on posterior side of it; and the antennæ are much shorter and thicker; and the serrated dilations of the two hinder pairs of femora are much wider. *Color:* head, thorax, tegmina, femora and distal $\frac{3}{5}$ths of costal area, above, bright pea-green; basal $\frac{2}{5}$ths of costal area scarlet vermilion; hyaline wings pale-green with stronger green veins; whole of under side of costal area scarlet vermilion with pale-green veins; tibiæ and tarsi brownish; upper surface of abdomen yellowish; sides and ovipositor green. Length from anterior part of head to end of abdomen 5 inches 2 lines. Proportional measurements in fractions of the length, taken as 100: length of head, $\frac{5}{100}$; of antennæ, $\frac{12}{100}$; of prothorax, $\frac{5}{100}$; of mesothorax, $\frac{8}{100}$; of metathorax, $\frac{20}{100}$; of abdomen, $\frac{66}{100}$; of ovipositor, $\frac{18}{100}$; of anal styles, $\frac{3}{100}$; of tegmina, $\frac{34}{100}$; width of tegmina, $\frac{11}{100}$; length of costal area of wing, $\frac{77}{100}$; width of costal area, $\frac{11}{100}$; width of wing, $\frac{43}{100}$; length of anterior femora, $\frac{25}{100}$; width of femora, $\frac{2}{100}$; length of 2nd pair of femora, $\frac{20}{100}$; width, $\frac{5}{100}$: length of hind femora, $\frac{24}{100}$; width, $\frac{6}{100}$.

This is apparently the insect referred to by Prof. Westwood (Cat. Orth. In., p. 166) as the Adelaide variety of *T. Childreni* with rose-color under side of costal area and tegmina and basal portion of costal area above, and showing as a variability a greater expanse of wing. I do not find any perceptible or important variation ; and therefore the wings are longer and less broad than in that species, the antennæ are shorter, and the perfectly constant, vermilion scarlet of the upper half of the costal area, and the under-side of the tegmina and costal area being of the same striking red, contrasts strongly with the green under-side of the tegmina and costal area and purple base of the wings of *T. Childreni*. The present species is distinguished from the *T. iodomus* by the red instead of violet base of wing above, and the splendid scarlet vermilion of the under-side of nearly the whole of the costal area and tegmina ; it likewise differs in the much stronger veins above and below the mid-vein of the tegmina, the much shorter antennæ, and the wider, dilated femora of the 2nd and 3rd pairs of legs.

When seen flying against the sun, the red of the under-side of the costal area of the wings overpowers the green of the distal portion of the upper surface, shining through, so as to appear of strikingly vivid scarlet vermilion, which disappears like magic when the creature alights, suddenly folds its great wings in a narrow green layer over the abdomen concealed by the costal area, the red base of which is exactly covered over and hid by the green tegmina, so that the whole agrees so nearly with the foliage of the *Eucalypti* on which it rests that the sharpest eye would miss it, especially if looking for the splendid scarlet flying creature of an instant before.

I might mention that the whitish and yellowish head, thorax, veins, and patches on the tegmina and the costal area seen in cabinet specimens of this and many described allied kinds of green Phasma are only *post mortem* bleachings, arising from the moisture of slightly decomposing soft parts, and in the living insects are leaf-green like the other green parts.

A rare species, occurring in the warmer northern parts of Victoria. The specimen figured is from Inglewood, and was procured for the National Museum from Mr. Plant, who found it.

EXPLANATION OF FIGURES.

PLATES 69 & 70.—Fig. 1, female, with wings extended as in flight, natural size, seen from below, to show the great extent of the scarlet on the under-side. Fig. 1*a*, upper surface of same specimen, to show the small extent of the red capable of being entirely covered and concealed by the upper tegmina when at rest. Fig. 1*b*, head, prothorax, and base of antennæ, magnified. Fig. 1*c*, terminal joints of body, showing styles and ovipositor, magnified.

FREDERICK McCOY.

By Authority: JOHN FERRES, Government Printer.

CONTENTS OF DECADES.

N.B.—The originals of all the Figures are in the National Museum, Melbourne.

DECADE I.

Plate 1.—The Black Snake (Pseudechys porphyriacus, Shaw sp.).
Plate 2.—The Copper-head Snake (Hoplocephalus superbus, Günth.).
Plate 3.—The Tiger Snake (Hoplocephalus curtus, Schl. sp.).
Plate 4.—The Australian Bream (Chrysophrys Australis, Günth.).
Plate 5.—The Spiny-sided Butterfly-Gurnard (Lepidotrigla Vanessa, Rich. sp.).
Plate 6.—The Kumu Gurnard (Trigla Kumu, Lesson and Garn.).
Plate 7.—The Australian Giant Earth-worm (Megascolides Australis, McCoy).
Plate 8.—Lewin's Day-moth (Agarista Lewini, Boisd.).
The Loranthus Day-moth (Agarista Casuarinæ, Scott).
The Vine Day-moth (Agarista Glycine, Lewin sp.).
Plate 9.—Pieris (Thyca) Harpalyce (Don. sp.).
Plate 10.—Pieris (Thyca) Aganippe (Don. sp.).

DECADE II.

Plate 11.—The Little Whip Snake (Hoplocephalus flagellum, McCoy). The White-lipped Snake (Hoplocephalus coronoides, Günth.).
Plate 12.—The Death Adder (Acanthophis Antarctica, Shaw sp.).
Plate 13.—The Carpet Snake (Morelia variegata, Gray).
Plate 14.—The Gippsland Perch (Lates colonorum, Günth.).
Plate 15.—The Murray Lobster (Astacoides serratus, Shaw sp.).
Plate 16.—The Salmon Arripis (Arripis truttaceus, Cuv. sp.). Adult.
Plate 17.—Ditto of the younger forms and coloring.
Plate 18.—The Horse Mackerel (Trachurus trachurus, Lin. sp.).
Plate 19.—The Small-scaled Rock Cod (Lotella callarias, Günth.).
Plate 20.—The Australian Rock Cod (Pseudophysis barbatus, Günth.).

DECADE III.

Plate 21.—The Sea-Leopard Seal (Stenorhynchus leptonyx, de Blainv. sp.).
Plate 22.—The Yellow-sided Dolphin (Delphinus Novæ Zealandiæ, Quoy and Gaim.).
Plate 23.—The Common Brown Snake (Diemenia superciliosa, Fisch.).
The Small-scaled Brown Snake (Diemenia microlepidota, McCoy).
The Shield-fronted Brown Snake (Diemenia aspidorhyncha, McCoy).
Plate 24.—Catenicella margaritacea (Busk).—C. plagiostoma (Busk).—C. ventricosa (Busk).—C. hastata (Busk.)—C. rufa (McG.).—C. cribraria (Busk).—C. alata (Wyv. Thomson).—C. lorica (Busk).—C. formosa (Busk).—C. elegans (Busk).—C. perforata (Busk).—C. Buskii (Wyv. Thomson).—C. Hannafordi (McG.).—C. crystallina (Wyv. Thomson).—C. carinata (Busk).—C. aurita (Busk).—C. geminata (Wyv. Thomson).—C. cornuta (Busk).—C. intermedia (McG.)
Plate 25.—Membranipora membranacea (Linn. sp.).—M. perforata (McG.).—M. ciliata (McG.).—M. mamillaris (McG.).—M. umbonata (Busk).—M. pilosa (Linn. sp.).—M. cervicornis (Busk).
Plate 26.—Membranipora dispar (McG.).—M. Woodsii (McG.).—M. lineata (Linn. sp.).—M. Rosselii (Audouin sp.).—M. Lacroixii (Savigny sp.).
Plate 27.—The Australian Rockling (Genypterus Australis, Cast.).
The Yarra Blackfish (Gadopsis gracilis, McCoy).
Plate 28.—The Southern Mackerel (Scomber pneumatophorus, De la Roche).
Plate 29.—The Yabber Crayfish (Astacoides bicarinatus, Gray sp.).
Plate 30.—The Large Wattle Goat-Moth (Zeuzera Eucalypti, Boisd. Herr.-Schæf.).

CONTENTS OF DECADES.

DECADE IV.

Plate 31.—The Australian Sea-Bear or Fur-Seal (Euotaria cinerea, Péron sp.).
Plate 32.—The Two-hooded Furina-Snake, Furina bicucullata (McCoy).
Plate 33.—The Banded Red Gurnet-Perch (Sebastes percoides, Solander sp.).
Plate 34.—The Angel-fish (Rhina squatina, Lin. sp.).
Plate 35.—Lepralia circinata (McG.).—L. Cecilii (Aud.).—L. diaphana (McG.).—L. marsupium (McG.).—L. subimmersa (McG.).—L. anceps (McG.).—L. Maplestonei (McG.).
Plate 36.—Lepralia vittata (McG.).—Membranipora perforata. Lepralia Brogniartii (Aud.).—L. elegans (McG.).—L. pertusa (Esper. sp.).—L. Malusii (Aud. sp.).—L. lunata (McG.).
Plate 37.—Lepralia ciliata (Linn. sp.).—L. trifolium (McG.).—L. cheilodon (McG.).—L. canaliculata (McG.).—L. larvalis (McG.).—L. diadema (McG.).—L. papillifera (McG.).—L. Ellerii (McG.).
Plate 38.—Lepralia monoceros (Busk).—L. excavata (McG.).—L. vitrea (McG.).—L. megasoma (McG.).—L. Schizostoma (McG.).—L. Botryoides (McG.).—L. ferox (McG.).—L. pellucida (McG.).
Plate 39.—Crisia Edwardsiana (D'Orb. sp.).—C. biciliata (McG.).—C. acropora (Busk).—C. setosa (McG.).—C. tenuis (McG.).
Plate 40.—Saunders' Case-Moth (Metura elongata, Saunders sp.).
The Lictor Case-Moth (Entometa ignobilis, Walk.).

DECADE V.

Plate 41.—The Lace Lizard (Hydrosaurus varius, Shaw sp.).
Plate 42.—The Spotted Marsh-Frog (Limnodynastes Tasmaniensis, Günth.).—The Common Sand-Frog (Limnodynastes dorsalis, Gray).
Plate 43.—The Carpet Shark (Crossorhinus barbatus, Lin. sp.).—The Seven-gilled Shark (Notidanus [Heptanchus] Indicus, Cuv.).
Plate 44.—The Barracouta (Thersites atun, Cuv.).—The Tunny (Thynnus Thynnus, Lin. sp.).
Plate 45.—Flustra denticulata (Busk).—Carbasea episcopalis (Busk).—C. dissimilis (Busk).—C. indivisa (Busk).—C. elegans (Busk).—C. pisciformis (Busk).
Plate 46.—Spiralaria florea (Busk).—Diachoris Magellanica (Busk).—D. spinigera (P. McGil.).—Dimetopia spicata (Busk).—D. cornuta (Busk).—Didymia simplex (Busk).—Calwellia bicornis (Wyv. Thomson).
Plate 47.—Dictyopora cellulosa (P. McGil.).
Plate 48.—Eschara obliqua (P. McGil.).—E. dispar (P. McGil).—E. gracilis (Lamx.).—E. platalea (Busk).—E. quadrata (P. McGil.)—E. mucronata (P. McGil.).—Caleschara denticulata (P. McGil.).
Plate 49.—Cellaria fistulosa (Linn.).—C. hirsuta (P. McGil.).—C. tenuirostris (Busk.).—C. gracilis (Busk).—Nellia oculata (Busk).—Tubucellaria hirsuta (Busk).
Plate 50.—The Great Black, or Manna Cicada (Cicada mœrens, Germ.).—The Great Green Cicada (Cyclochila Australasiæ, Donov. sp.).

DECADE VI.

Plate 51.—The Victorian Rhodona (Rhodona Officeri, McCoy).
Plate 52.—The Black and White Ringed Snake (Vermicella annulata, Gray).
Plate 53.—The Green and Golden Bell-Frog (Ranoidea aurea, Less. sp.).
Plates 54–55.—The Australian Aulopus (Aulopus purpurisatus, Rich.).
Plate 56.—The Hammer-headed Shark (Zygæna malleus, Shaw).—The Common Australian Saw-Fish (Pristiophorus nudipinnis, Günth.).
Plate 57.—Biflustra perfragilis (McGil.).—B. delicatula (Busk).
Plate 58.—Cellularia cuspidata (Busk).—Menipea crystallina (Gray sp.).—M. cyathus (Wyv. Thomson).—M. cervicornis (McGil.)—M. tricellata (Busk).—M. Buskii (Wyv. Thomson).
Plate 59.—Bicellaria tuba (Busk).—B. grandis (Busk).—B. ciliata (Linn).—B. turbinata (McGil.).—Stirparia annulata (Map.).—Bugula neritina (Linn.).
Plate 60.—Steganoporella magnilabris (Busk. sp.).—Petralia undata (McGil.).

CONTENTS OF DECADE VII.

N.B.—The originals of all the Figures are in the National Museum, Melbourne.

PLATE 61.—The Tuberculated Argonaut (Argonauta oryzata, Meusch.).

PLATE 62.—The same seated in its so-called shell or Paper-Nautilus.

PLATE 63.—The Blue-spotted Eagle-Ray (Myliobatis Australis, Macleay).

PLATE 64.—The Long-toothed Bull-Shark (Odontaspis taurus, Raf.).—The Australian Tope Shark (Galeus Australis, Macleay).

PLATE 65.—The Leafy Sea-Dragon (Phyllopteryx foliatus, Shaw sp.).—The Short-headed Sea-horse (Hippocampus breviceps, Pet.)

PLATE 66.—Dictyopora grisea (Lamx. sp.).—D. albida (Kirch.)—(Var. avicularis, P. McGill.).

PLATE 67.—D. Wilsoni (P. McGill.).

PLATE 68.—Idmonea Milueana (d'Orb.).—I. contorta (P. McGill.).—I. radians (Lamk.).

PLATES 69–70.—The Violet-shouldered Phasma (Tropidoderus iodomus, McCoy).—The Red-shouldered Phasma (Tropidoderus rhodomus, McCoy).

MARY D. ROGICK

Natural History of Victoria.

PRODROMUS

OF THE

ZOOLOGY OF VICTORIA;

OR,

FIGURES AND DESCRIPTIONS OF THE LIVING SPECIES OF ALL CLASSES

OF THE

VICTORIAN INDIGENOUS ANIMALS.

DECADE VIII.

BY

FREDERICK McCOY, F.R.S.,

HONORARY FELLOW OF THE CAMBRIDGE PHILOSOPHICAL SOCIETY; HONORARY ACTIVE MEMBER OF THE IMPERIAL SOCIETY
OF NATURALISTS OF MOSCOW; CORRESPONDING MEMBER OF THE ZOOLOGICAL SOCIETY OF LONDON;
HONORARY MEMBER OF THE ROYAL SOCIETY OF NEW SOUTH WALES; HONORARY MEMBER OF SEVERAL OTHER
SCIENTIFIC SOCIETIES, ETC.
PROFESSOR OF NATURAL SCIENCE IN THE MELBOURNE UNIVERSITY.
DIRECTOR OF THE NATIONAL MUSEUM OF NATURAL HISTORY AND GEOLOGY OF MELBOURNE, ETC.

MELBOURNE:
BY AUTHORITY: JOHN FERRES, GOVERNMENT PRINTER.
PUBLISHED BY GEORGE ROBERTSON, LITTLE COLLINS STREET.
LONDON: TRÜBNER AND CO., 57 AND 59 LUDGATE HILL; AND GEORGE ROBERTSON,
17 WARWICK SQUARE.

M DCCC LXXXIII.

Natural History of Victoria.

PRODROMUS

OF THE

ZOOLOGY OF VICTORIA;

OR,

FIGURES AND DESCRIPTIONS OF THE LIVING SPECIES OF ALL CLASSES

OF THE

VICTORIAN INDIGENOUS ANIMALS.

DECADE VIII.

BY

FREDERICK McCOY, F.R.S.,

HONORARY FELLOW OF THE CAMBRIDGE PHILOSOPHICAL SOCIETY; HONORARY ACTIVE MEMBER OF THE IMPERIAL SOCIETY OF NATURALISTS OF MOSCOW; CORRESPONDING MEMBER OF THE ZOOLOGICAL SOCIETY OF LONDON; HONORARY MEMBER OF THE ROYAL SOCIETY OF NEW SOUTH WALES; HONORARY MEMBER OF SEVERAL OTHER SCIENTIFIC SOCIETIES, ETC.
PROFESSOR OF NATURAL SCIENCE IN THE MELBOURNE UNIVERSITY.
DIRECTOR OF THE NATIONAL MUSEUM OF NATURAL HISTORY AND GEOLOGY OF MELBOURNE, ETC.

MELBOURNE:
BY AUTHORITY: JOHN FERRES, GOVERNMENT PRINTER.
PUBLISHED BY GEORGE ROBERTSON, LITTLE COLLINS STREET.
LONDON: TRÜBNER AND CO., 57 AND 59 LUDGATE HILL; AND GEORGE ROBERTSON,
17 WARWICK SQUARE.

M DCCC LXXXIII.

PREFACE.

It having been considered desirable to ascertain accurately the natural productions of the Colony of Victoria, and to publish works descriptive of them, on the plan of those issued by the Governments of the different States of America, investigations were undertaken, by order of the Victorian Government, to determine the Geology, Botany, and Zoology of the Colony, to form collections illustrative of each for the public use, and to make the necessary preparations for such systematic publications on the subject as might be useful and interesting to the general public, and contribute to the advancement of science.

As the geological and botanical investigations have already approached completion, and their publication is far advanced, it has been decided now to commence the publication of the third branch completing the subject, namely, that of the Zoology or indigenous members of the different classes of the animal kingdom.

As the Fauna is not so well known as the Flora, it was a necessary preliminary to the publication to have a large number of drawings made, as opportunity arose, from the living or fresh examples of many species of reptiles, fish, and the lower animals, which lose their natural appearance shortly after death, and the true characters of many of which were consequently as yet unknown, as they had only been described from preserved specimens. A Prodromus, or preliminary issue, in the form of Decades, or numbers of ten plates, each with its complete descriptive letterpress, will be published, of such illustrations as are ready, without systematic order or waiting for the completion of any one branch. The many good observers in the country will thus have the means of accurately identifying various natural objects, their observations on which, if recorded and sent to the National Museum, where the originals of all the figures and descriptions are preserved, will be duly acknowledged, and will materially help in the preparation of the final systematic volume to be published for each class when it approaches completion.

This eighth Decade gives figures in the first plate of the Victorian Sea-Bear, or Eared, or Fur Seal, of which an unusually grey female in the swimming position was figured in an earlier Decade. The additional representations here given show the adult male with its peculiar profile and slight mane, and the female, both of the more common brown colour. The present figures show the peculiar attitudes assumed on land, where the limbs are used like legs, raising the body from the ground as in ordinary quadrupeds, and totally unlike the more common ear-less Seals, in which the hind legs are fixed in the backward direction with the tail. The dark young is also shown. This plate is the first I have the pleasure of presenting by Dr. Wild, the famous artist of the *Challenger* Expedition.

The second plate figures one of our peculiar genera of Australian Lizards, *Cyclodus*, familiar to observers in the bush from its dull, sluggish habits and bright-blue tongue; from which characteristics its popular names are derived.

The third plate shows the natural colours for the first time of the best of our brackish-water fishes for the table, namely the thick-skinned "Ludric" of the Gippsland Lakes.

The fourth plate represents a specimen from Hobson's Bay of the most terrible of all Sharks, "The White Shark," the dread of sailors in warm and temperate seas, but of which no good figure from life has been given before.

The fifth plate shows our common Picked Dogfish to be identical with the European *Acanthias vulgaris*.

The sixth and seventh plates give figures of the *Sepioteuthis Australis*, one of our large species of the ten-armed group of Cuttlefishes, having a row of horny spines round the edge of each of the suckers; and having a transparent internal horny "pen," popularly mistaken for an approach to the backbone of the vertebrate animals by rash upholders of the "progressive development" theory.

The eighth plate gives illustrations of the Victorian species of *Bugula*, contributed by Dr. MacGillivray to the National Museum and this work.

The ninth plate represents the character of one of the curious twig-like *Phasmæ* of the genus *Acrophylla*, showing the striking sexual differences.

The tenth plate figures the female of the greatest of our gigantic *Phasmæ*, the large pink-winged *Phasma* of the genus *Podacanthus*, showing the colours of life for the first time.

The succeeding Decades will illustrate as many different genera as possible, and will deal first usually with species of some special interest, and of which good figures do not exist, or are not easily accessible.

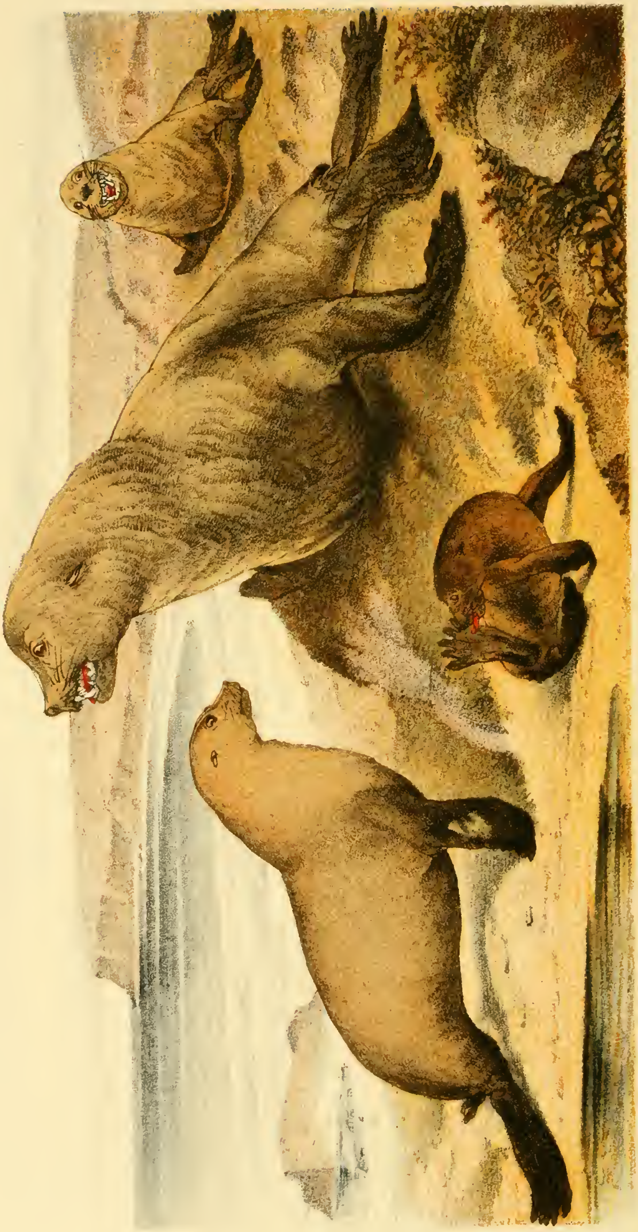
FREDERICK McCOY.

16th August, 1882.

Pl 71

ZOOLOGY OF VICTORIA

(Mammalia)



[illegible] Wild ad nat lith

Prof McCoy dirext

Steam litho Govt. Printing Office

Plate 71.

EUOTARIA CINEREA (Péron sp.).

The Australian Sea-Bear or Fur-Seal.

[Genus EUOTARIA (Gray). (Sub-kingd. Vertebrata. Class Mammalia. Order Feræ. Section Pinnipedia. Fam. Phocidæ. Sub-fam. Otarinæ.)

Gen. Char.—Incisors, $\frac{3-3}{2-2}$; upper outer ones very large, like canines; four middle ones small, and with cutting edges doubled by a transverse groove; lower ones small, sub-equal, simple. Canines, $\frac{1-1}{1-1}$; large, conic. Molars, $\frac{6-6}{5-5}$; triangular, pointed, compressed, with a small cusp at base, behind or before, or both; sixth or hind molar entirely behind the hind margin of front of zygomatic arch, with anterior branch of fang arched, diverging to front; the fangs of fourth and fifth imperfectly divided by a sulcus. Skull depressed; of males, broad, with the occipital portion elevated and becoming crested with age; that of females narrower, not so elevated behind, and with little or no occipital crest; palate extending to middle of zygoma. Head blunt. Anterior limbs falcate, with four or five rudimentary nails; hind limbs bent forwards when resting or walking, with long nails on three middle toes, and very small ones on the two outer toes. Body tapering, tail short. Males larger and with proportionately larger limbs than the females. Hair rather coarse, with scanty or no under-fur at base.]

Thinking it desirable to visit the actual locality in Western Port Bay, where the French voyagers with Quoy and Gaimard originally found the type specimen of this species, still in the Paris Museum, I last year went out in a small steamer from Phillip Island to the smaller island on which these Seals abound in the breeding season. The coast is so rocky, and the surf so dangerous that it is only on rare occasional days that a landing can be safely made, and on this occasion it was quite impossible to do so. On looking with a good binocular, one could soon make out that the greater number of what looked like brown, bare, rounded rocks over the surface of the island were really Seals. On the steam whistle being blown they all started up, and, with the precise action of a flock of crowded sheep driven by a dog, they awkwardly galloped in a confused cluster, jumping up on those in front in their hurry to get down to the sea, into which most of them plunged; a few old large males alone standing their ground, well raised up on their bent fin-like legs, as in our plate, with their broad breast to the foe, and head raised, threateningly showing their teeth, and erecting the hair of the neck angrily, like a short mane. After a little while, scores of the females and younger males came swimming out to our little vessel to look at us, raising their kind, intelligent, good-humored, dog-like heads, with beautiful large, brown, soft eyes, looking like large Retriever Dogs with the pleased and friendly expression they wear when approaching their masters.

Making an arrangement with an old sealer living on Phillip Island, and greatly aided by Mounted Constable George Ardill, stationed on duty there, I ultimately got for the Melbourne Museum the fine old male, the adult female, and the young one, figured on our present plate in the attitudes of life when on land, as noted at the time, and now represented by Dr. Wild (the accomplished artist, formerly of the *Challenger* Expedition) from the preserved specimens set up with every attention to accuracy of form and position of the parts. These additional lithographs of this species, not figured by Mr. Gould, and which will soon become extinct on our shores, were desirable because our former figure, in Plate 31 (Decade IV.), was of an unusually grey specimen, and only gave the position of the limbs and body when swimming, which differs little from other Seals; while the attitudes assumed on land, shown in the present plate, are peculiar to the Seals having external ears.

The task of procuring the required specimens was by no means an easy one, for not only is it difficult to land, even in the calmest weather, but if a boat approached the island by day the Seals would take to the water, and not return so long as the men were to be seen. It was therefore determined to land on the first calm evening, and bring blankets and food for the night, to be passed in some of the caves found there, so that, as the Seals came back at night to rest, the sealers might quietly emerge before daybreak, and, selecting an adult old male and female, make sure of them with heavy rifles used for the purpose, and take chance of catching a young one in the confusion. This was at last successful, and I was enabled to get accurate drawings of the diverse profiles of the male and female, and of all the soft parts while yet in the flesh.

During the breeding season the roaring of the old males may be heard half a mile off, high above the thunders of the surf, and they show great courage and ferocity in defending the females and young when attacked by man. The young are very easily tamed, and one was going about the kitchen of the hotel at the time of my visit like a rather lame dog, following the housekeeper everywhere with affectionate pertinacity, and playing with a young kangaroo and some other tame animals about the house with all the fun of a kitten or young puppy. It would come when called like a dog, and obviously liked to have its head stroked with the hand.

Having told my friends, Trooper Ardill and the sealer, Ross, that I should like to have their observations on the creature in writing for publication, the former furnished me with the following interesting account, which I give in his own words, conveying Ross's observations and his own :—

Cowes Police Station, 12th March 1880.

In reply to your enquiries relative to the Seals which frequent the Seal Rocks off Phillip Island :—The Seals come to the rocks about 1st October. The time of bringing forth the pups is between 10th November and 10th December. They do not commence to breed until they are three years old. The male (or bull) during the pupping season will ascend the rocks and stop for one or two months without food, and is extremely attentive to the female (or cow) and pups. When the females fight and quarrel he restores order. The bull is very fat in the beginning of the season, and yields from five to ten gallons of oil, and in three weeks after will hardly yield one gallon, the yield of course depending on the age and size of the bull. The cows are seldom killed, as they have very little fat. It is against the rule of sealers to kill a cow or the pups.

They live on fish of various kinds. I have found the backbones of fish 2 feet in length. They eat leather-jackets, parrot fish, squid, &c. I found one backbone 2 feet 4 inches long; it may have been a barracuta or pike; I don't think it was a shark. I have found a few joints of a shark's backbone.

The bull is very furious at pupping season, and when disturbed will go into the water and return in a few minutes. Out of season they go to sea in the morning and return at night. When fighting they strike each other like the boar; their teeth are about 1½ inches long, and cut terribly. I have seen cuts from 1 to 10 inches in length.

The usual color is a yellowish-brown, although some have been seen that were spotted, and some a beautiful grey.*

They generally select flat, inaccessible rocks, or, where they are not disturbed, they select the grassy patches.

The cow generally brings forth one pup, sometimes two. They keep good watch, and care affectionately for their offspring. They circle round them in rough stormy weather, and keep them from any wash or sea that may come over the rocks. I have seen three pups washed off the rocks, and the cows have immediately followed and brought them on the rocks again in an astonishingly rapid manner. I have also seen them catch a pup in their mouth, and throw them 10 feet high, and never hurt them.

---

* This is the variety figured in Decade IV., Plate 31.

The bull's voice or noise is guttural, and, when angry, sounds something like "oough oough;" the noise is much heavier than any animal I know. When trying to pacify the cows it sounds like "yah yah," said quick and short. The noise of the cow is very much like a cow of the bovine species. The pup bleats like a lamb.

Their sight is not so good, so it is generally said. I think, myself, their sight good enough, but they not smelling man don't think he will harm them; when they get the least scent they are off like a shot.

During the pupping season they keep up an incessant noise during the night, and generally keep quiet during the day. They look clumsy and awkward on the rocks, but they are very lively when on the move.

I consider them as quick in their movements as any fish that swims. They strike at one another with the rapidity of lightning. I have seen one bull prevent another from landing for several hours. They move along by drawing the hinder part of the body forward and under, and then giving a jump and push forward.

If they are disturbed before they pup, they will leave the rock and go to another.

The cow has six teats, I think, which they draw into the udder or body when not suckling their young. The milk is very white and strengthening. Should a cow die or be killed, her pup is suckled by the other cows. This I am told is the case, but I can't vouch for it. All I write is my experience on the Seal Rocks, off "The Nobbies," at Phillip Island, Victoria.

I can't say whether they inhabit these rocks all the year or not, but don't think so. I have heard Ross say they do not.

As regards their habits, fur, ears, &c., &c., the only difference being in the colour; some are darker than others.

They are found along the coast, as far as I know, from Phillip Island to Wilson's Promontory. Nearly all the islands in Bass's Straits are inhabited by seals.

I know of no other fur or eared seal; in fact there is no other seal about here.

(Signed) George Ardill,
Mounted Constable.

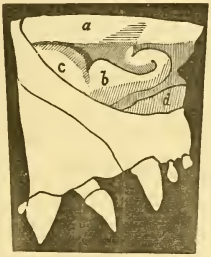
The large bull above referred to, although 7 ft. 9 ins. long, had the epiphyses of the limb bones quite loose, as if young; the skull bones were, however, much more powerfully crested than in those previously described in Decade IV.

The following are the detailed measurements:—

	Ft.	ins.
Length from tip of snout to extremity of tail	7	9
„ from tip of snout to edge of lip	0	3½
„ from tip of snout to occiput	1	2
„ from tip of snout to edge of front of pectoral ...	3	9
„ between eyes across forehead	0	5¼
„ from tip of snout to eye	0	5½
„ from tip of snout to ear	0	11
„ of pectoral	2	1½
„ of ear	0	2¼
„ of tail	0	3
„ of hind fin	1	7¼
Greatest width of hind fin...	1	2½
Length of Whiskers	0	7¼
Girth in front of shoulder...	6	10

The bare portion of snout below 2 inches long, and 1 inch 10 lines in greatest width; the width of portion between the nostrils being only half an inch, and 1 inch 3 lines long. The middle nail of hind foot is 1 inch long, but from its tip to edge of the cartilaginous fin is 3½ inches. Mr. Clark states (l. c., p. 662) that the corresponding nail in the New Zealand *O. Forsteri* is only its own length from the edge, while suggesting that this distance may be a specific character.

The nasal cartilage here figured from a young skull is more complex than that of *O. Forsteri* figured by Mr. Clark (Zool. Jour. 1875, p. 665). The upper fold (*a*) is, like it, wider in the centre, but has a shallow dividing furrow extending from the middle of the lower side obliquely upwards and forwards. The lower fold (*b*) and the hinder one, or bulla, as Mr. Clark calls it (*c*), are both as flexible as the upper fold, and further differ in the fold (*b*) having a circinate or crozier-shaped backward defined prolongation on its upper anterior end. The ligament (*d*) is alike in both. In this young skull, 6 ins. long, the described cartilages are 1 inch 2½ lines long.



The bare parts of the snout and flippers, in the living state, are black; and the nostrils angulated. The general colour of the surface is yellowish grizzly brown; ears lighter, with black tip; middle of breast and belly darker brown; under-fur light chestnut-brown, darkest on belly.

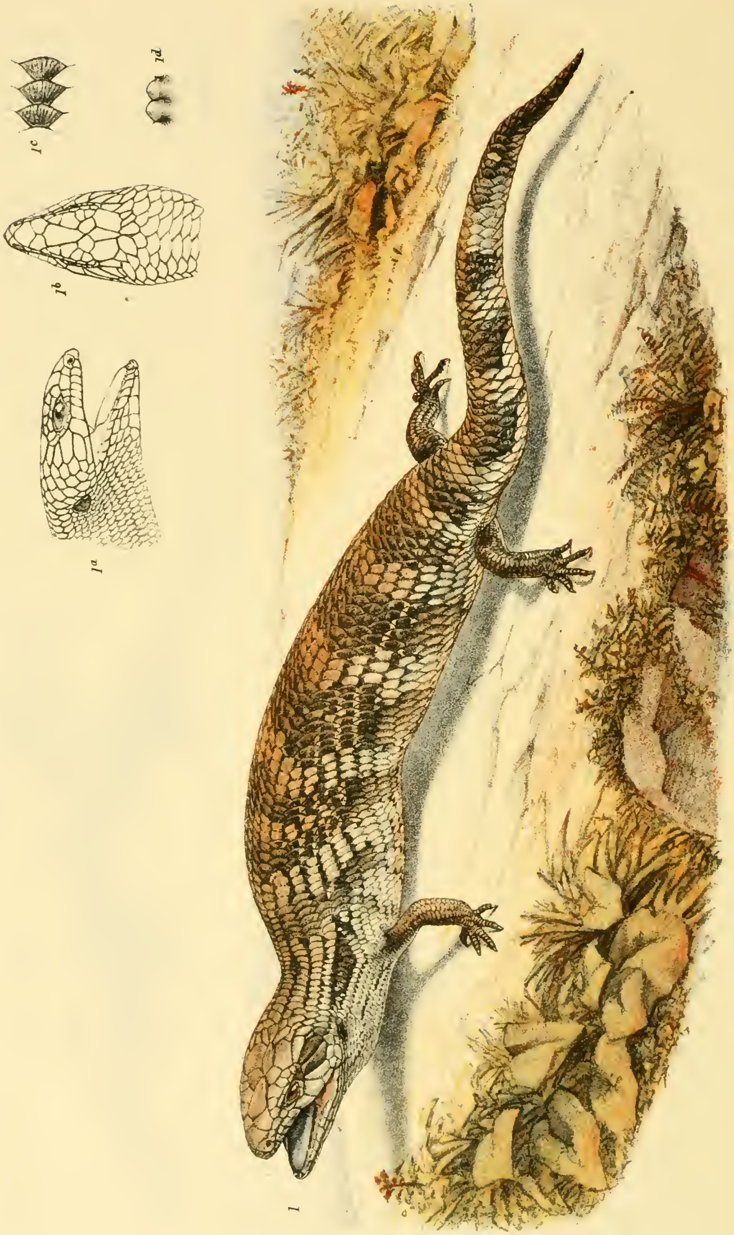
The snout of the adult male is not nearly so slender, tapering, and obliquely truncated as in the New Zealand *O. Forsteri*, as figured by Mr. Clark and Dr. Hector (Zool. Jour., Dec. 7, 1875, pp. 660 and 663); and in the females and young the snout is more bluntly rounded, and the nostrils more nearly terminal than in the adult. The outline figures I give now are reduced from the life-sized drawings made from specimens before being skinned, and can be compared with the corresponding views given by Mr. Clark of the *O. Forsteri*. Instead of the great concavity figured vertically over the eye in *O. Forsteri*, our species shows a great convexity there, the concavity in the male being at half-way between the eye and the tip of the snout, making the head much shorter and rounder in profile than in the N. Zealand species. The female and young have the head still shorter and rounder, and our figure shows that the nostrils are more nearly terminal in the young, on a blunt muzzle.

The hair is moderately coarse, and about 1½ inches long on back of neck of male, and rather more than ¾ of an inch on the back, and about ½ inch long on belly. The individual hairs on neck and back are mostly light-yellowish grey throughout, mixed with rather fewer of a blackish-brown colour, having tip and small part of base of a pale-yellowish colour; the hairs below are uniform dark brown, except a small portion of base, which is nearly colourless.

Explanation of Figures.

Plate 71.—The left-hand figure is an adult female, with the lower rounded profile of the head found in that sex. The large upper middle figure is an adult male, showing the elevation of the forehead produced by the more prominent occipital crest of the skull, giving the characteristic profile of the old male; also showing the longer hair of the neck and breast, constituting an imperfect mane, found only in this sex. The right-hand figure is a front view of an old male to show the narrow, elevated mesial ridge of the head. The middle lower figure represents the dark young in an attitude taken, like the others, from life.

Frederick McCoy.



D. T. Wild ad nat. lith. Prof. McCoy direxᵗ Steam litho. Govt. Printing Office

PLATE 72.

CYCLODUS GIGAS (BODD. SP.).

THE NORTHERN BLUE-TONGUED LIZARD.

[Genus CYCLODUS (WAGLER). (Sub-kingd. Vertebrata. Class Reptilia. Order Sauria. Sub-order Leptoglossæ. Tribe Geissosauria. Family Scincidæ.)

Gen. Char.—Form moderately thick, elongate, fusiform. Head large, thick, subtrigonal, obtusely pointed in front. Neck short, thick; head-shields thick, rather rugose; nasal plates near the tip of snout touching (or nearly) each other above, ovato-trigonal; nostril in centre of nasal plate, with a curved furrow bordering its posterior edge; inter-nasal plate rhombic; no supra-nasals; fronto-nasals two, moderate, touching; frontal large, broad, obtuse-angled in front, narrow behind; two moderately large fronto-parietal plates; parietals large; inter-parietal resembling the frontal, and nearly as long but much narrower, acute-angled in front; six superciliary plates over each eye, the second largest; about five rows of temporal plates between the eye and the ear; polygonal occipital shields in one or more transverse rows; orbit surrounded by a row of small plates; two frenal plates between the nasal plate and the orbit; lower eye-lid scaly. Ear-opening large, partly hidden by a projecting row of three or four thin, rounded scales on front margin. Scales of back and sides bony, large, convex, subhexagonal, rugose, with obscure diverging grooves; scales of belly thinner and smoother. Legs four, nearly equal, small, short, strong; feet small, each with five short, cylindrical, sub-equal toes; claws short, thick. Tail short, rather less than one-third of the total length, sub-cylindrical, very slightly compressed laterally, tapering, with rather thicker scales than the back of the body, and a central row of large, broad scales below. Tongue short, flat, scaly, slightly notched at the point. Teeth on edge of jaws bluntly rounded; palate without teeth, with a triangular notch behind.]

DESCRIPTION.—Form elongate, rounded, moderately depressed; head obtusely pointed in front, widening behind to the ear, and moderately narrowed to the short thick neck. The four temporal plates immediately behind the row of ocular plates surrounding the eye, and forming the side of the cheek from the parietal plates above to the hindmost labial plates below, about twice the length of those temporal plates next following them posteriorly. Rostral plate much wider than long. Nasal plates usually joining for a short space (but sometimes not joining) above. Inter-nasal plate about one-fifth longer than wide. Width of anterior part of frontal about three-fifths of the length. Inter-parietal plate very narrow behind, about twice as long as wide. Lower projecting scales on anterior edge of ear-drum largest. General colour yellowish very pale brown, greyer and lighter below, crossed by from 14 to 20 transverse bands of rich dark-brown, varying from 3 to 6 scales wide on the back, with narrower intervening light bands crossing from the neck to the tip of the tail, the two anterior transverse bands on the neck and shoulder much narrower than the others. One longitudinal very dark patch over the shoulder, extending from near the ear, is nearly constant and darker than any other mark. A less dark patch over the middle temporal plates from behind the eye to nearly over the ear sometimes present and sometimes absent. Top of the head uniform very light brown, becoming paler on the sides of the head and neck, and more distinctly yellow on the throat. The longitudinal rows of scales on the anterior part of the back are marked by narrow, indistinct, longitudinal dark-brown streaks at the lateral margins of each scale. On the sides there are usually three or four indistinct longitudinal lines on each side of triangular light-colour spots, continuing the lines of the anterior brown streaks (but not constant). Under-side of body and tail irregularly flecked or reticulated with triangular brown spots, imperfectly continuing the transverse bands of the back and sides, but often absent. Legs with the margin of the scales dark-brown on the upper and hinder surface. Tongue bright Prussian blue, inside of mouth pink.

	Ft.	ins.	lines.
Total length of rather large specimen	1	9	9
Length of head from snout to anterior edge of ear ...	0	2	4
Length of inter-nasal plate	0	0	5
Width „ „	0	0	6
Length of frontal plate	0	0	7
Greatest width of do.	0	0	4½
Length of inter-parietal	0	0	7
Greatest width of do.	0	0	4
Length of middle temporal plate	0	0	7
Height of rostral plate	0	0	3
Diameter of ear	0	0	2½
From tip of snout to anterior edge of shoulder	0	4	0
Length of anterior limb to tip of longest claw	0	2	6
„ of longest toe and claw	0	0	5
„ from anterior edge of shoulder to anterior edge of thigh	0	7	6
„ of hind limb to extremity of longest claw	0	2	6
„ of tail	0	8	0
Girth round middle of body	0	8	0
Four transverse and five longitudinal rows of scales in space of one inch on middle of back.			

REFERENCE.—*Scincus gigas* (Boddaert), Nov. Act. Curios. Nat. Acad. v. 7, p. 5 = *Lacerta sincoides* (White) J. Voy. N.S.W., t. 30 = *Cyclodus flavigularis* (Wooster) Leon. Descript. Amphib. t. 6 = *Cyclodus Boddaerti* (Dum. and Bib.) Erp. Gen. v. 5, p. 752.

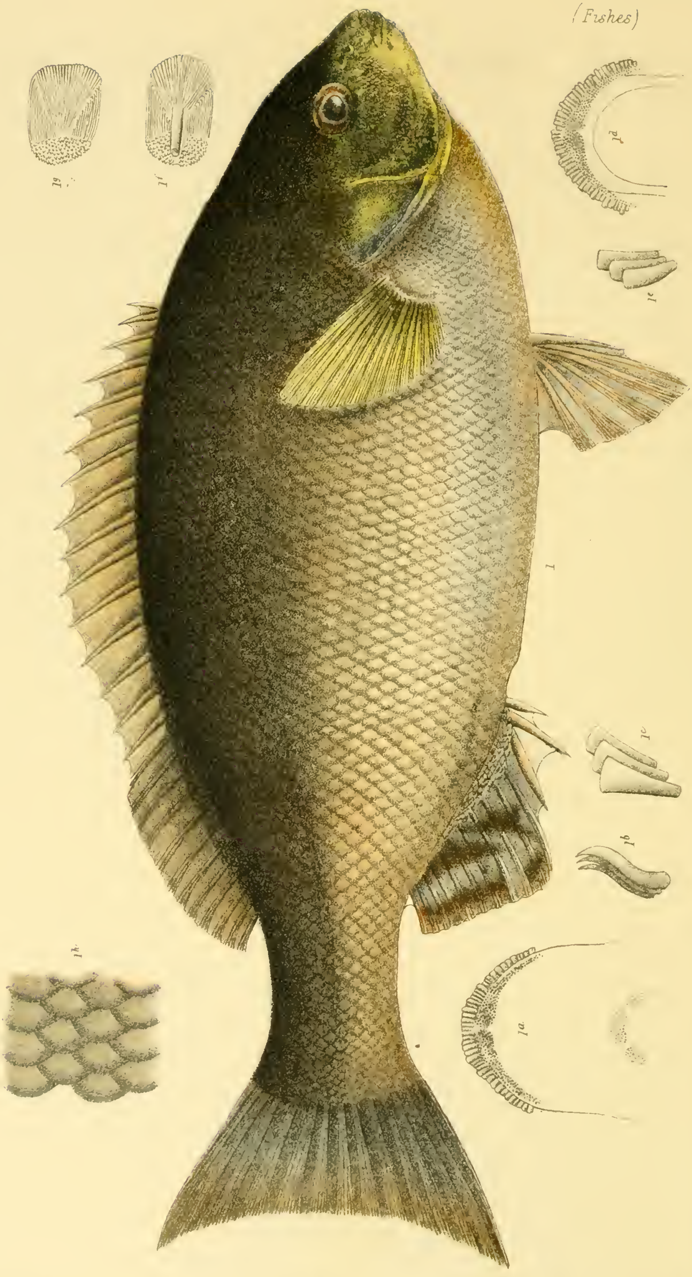
There are two Lizards of the genus *Cyclodus*, very nearly alike, found in Victoria. The one figured, the *C. gigas*, is very rare near Melbourne, becoming more common farther north into New South Wales. It is easily distinguished from the more common species, the *C. nigro-luteus*, by the four anterior temporal plates of the first row behind the eye being double the length of the next following, more posterior, row. The disposition of the colouring varies to the extent referred to above, but always shows the transverse dark and light bands, instead of the lateral rows of large light blotches of the second species, in which the anterior temporal plates are relatively only half the length, not equalling those of the next following, more posterior, row. Both have the startlingly bright-blue tongue, which the creature displays in its pink open mouth when touched. When taken in the hand it does not bite, nor make any other hostile demonstration. These Lizards are very sluggish, so that the popular name "Sleepy Lizard" as well as "Blue-tongue" comes to be applied to both.

The specimen figured is from near Melbourne. There has been no good figure of this creature hitherto published, with sufficient detail to be useful for accurate identification of the species.

EXPLANATION OF FIGURES.

PLATE 72.—Fig. 1, specimen one-half natural size. Fig. 1*a*, plates of side of head. Fig. 1*b*, plates of top of head. Fig. 1*c*, scales of back, natural size. Fig. 1*d*, teeth, magnified two diameters.

FREDERICK McCOY.



A. Bartholomew del. et lith.   Prof. McCoy direxit   Steam lith. Govt. Printing Office

PLATE 73.

GIRELLA SIMPLEX (RICH. SP.).

THE LUDRICK.

[Genus GIRELLA (GRAY) = MELANICHTHYS (TEM. and SCH.). Sub-kingd. Vertebrata. Class Pisces. Sub-class Teleostea. Order Acanthopterygii. Fam. Sparidæ. Sub-fam. Cantharinæ.)

Gen. Char.—One to three rows of large, flat, sharp-edged teeth, with tricuspid or straight, horizontal edges, on outer margins of each jaw, within which is a band of numerous minute teeth; no molars; in some species a patch of small teeth on the vomer and palatine bones. Cheeks scaly. Operculum without scales, except on the upper angle. Dorsal spines fourteen or fifteen; when depressed resting in a groove. Scales moderately large. Branchiostegals six. Pyloric cæca numerous. Swimming bladder bilobed behind.]

DESCRIPTION.—*Form:* Ovate, moderately thick. *Fin-rays:* Dorsal 15 spined, 12 soft, the last one double, 7th spine longest, slightly exceeded by longest (3rd) soft ray; caudal 20; anal 3 spined, 11 soft, last one double; pectoral 17; ventrals 1 spined, 5 soft. *Scales* minutely serrated, 69 along lateral line, and about 5 beyond on the caudal fin; 12 above lateral line, and 17 large and 9 or 10 small below. *Colour:* Nearly uniform blackish-grey, with a purple tinge, darkest on back and soft dorsal, and on caudal and anal fins; sides of mouth and head below the eye from snout bright king's yellow, gradually fading on operculum; pectoral fin pale-brownish yellow; chin, throat, belly, and ventral fins whitish; iris silvery. *Teeth:* Three outer rows in each jaw large, incurved, with nearly straight, broad, cutting edges; within them a band of very minute similar ones; a trigonal patch of minute teeth on the vomer, and an ovate similar patch on each palatine bone.

MEASUREMENTS OF MODERATELY LARGE SPECIMEN.

	Ft.	ins.	lines.
Length from tip of snout to end of body	1	4	6
„ of middle of caudal	0	2	6
„ from tip of snout to corner of mouth	0	1	1
„ „ „ anterior edge of orbit ...	0	1	5
„ „ „ end of operculum	0	4	0
„ „ „ base of pectoral	0	4	0
„ „ „ base of ventrals	0	5	9
„ „ „ first spine of dorsal	0	5	6
„ „ „ last spine of dorsal	0	11	0
„ „ „ last soft dorsal ray	1	2	0
„ „ „ first spine of anal	0	10	9
Greatest depth of body	0	6	0
„ thickness of body	0	1	9
Diameter of orbit	0	0	8
Length of pectoral	0	2	7
„ ventral spine	0	1	5
„ 1st soft ray of ventral	0	2	7
„ 1st dorsal spine	0	0	6½
„ 7th „	0	1	5
„ 1st anal spine	0	0	7
„ 2nd „	0	1	0
„ 3rd „	0	1	2
„ 2nd soft ray...	0	1	9
Width of caudal	0	5	3

Number of scales in one inch at middle of body, three.

REFERENCE.= *Crenidens simplex* (Richard.), Voy. Er. and Ter., Fishes, p. 120.

This is one of the best fishes for the table found in Victoria, but is not well known to the public or the dealers, although abundant in the Gippsland Lakes. It is also not very uncommon in the sea outside as far as Hobson's Bay, where it is occasionally found at Mordialloc and Brighton, although it is there so unknown to the fishermen as to be brought to me as a rarity when they catch it. In the Gippsland district it goes by the native name of "Ludrick," and is greatly preferred even to the excellent Gippsland Perch (*Lates colonorum*, see our Plate 14). It has a remarkably thick skin, by which the unscientific carver distinguishes it from its allies at table. The three outer rows of long, incurved teeth, having each a broad, nearly straight cutting edge, like a chisel, instead of the trilobed edge of the other species of *Girella*, is the perfectly constant and easily observed character referred to in the specific name. The patches of small, crowded teeth on the vomer and on the palatine bones seem another dental peculiarity of the species. The disc of each scale is smooth, the remainder towards the margin with rough, radiating, minute ridges, terminating in a very fine serration of the edge.

The species is curiously like the *G. tricuspidata*, or "Black Perch" of the fishermen, except in the simplicity of the edges of the teeth, almost suggesting the idea of this being a sexual instead of a specific character.

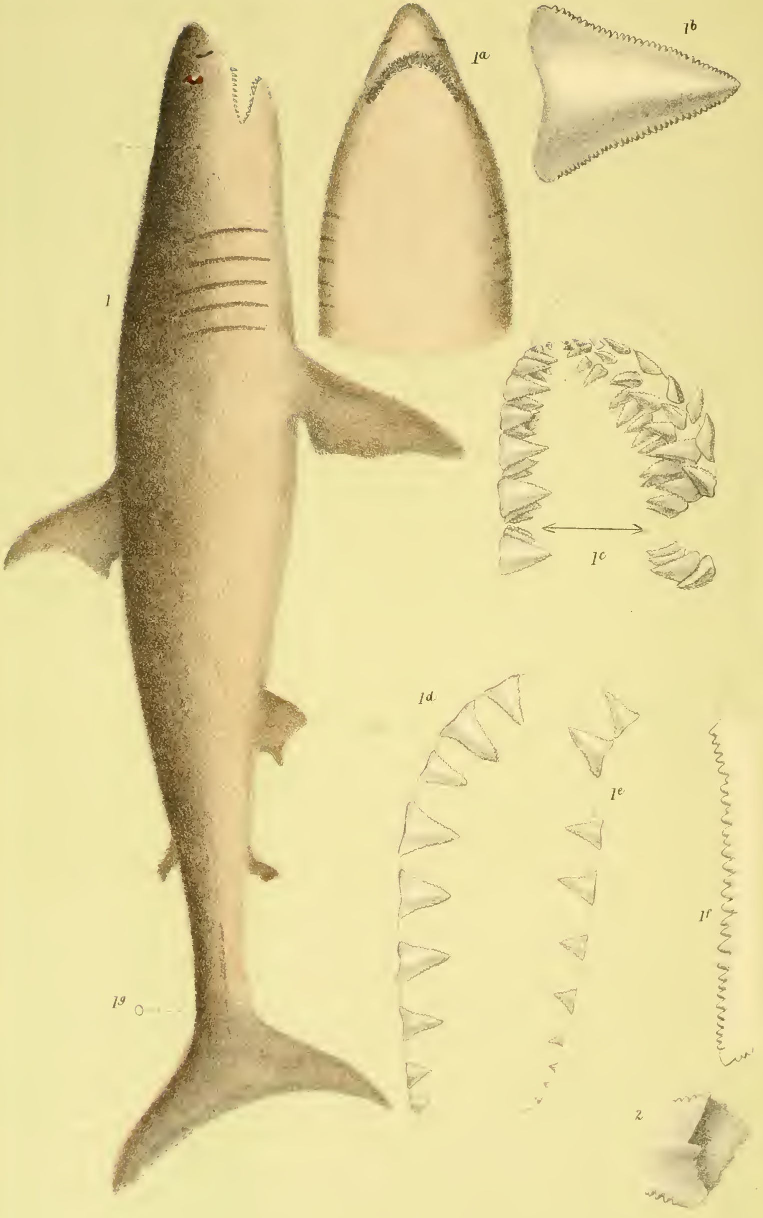
It is rarely quite so large as the one measured above ; but one specimen in the Museum is 1 ft. 11 inches in total length.

This fish has not been figured before.

Explanation of Figures.

Plate 73.—Fig. 1, side view, reduced. Fig. 1*a*, inner view of upper portion of mouth, natural size, showing the large outer rows of teeth, and the more numerous rows of similar but much smaller teeth, as well as the patches of small teeth on the vomer and palatine bones. Fig. 1*c*, front view of large teeth, magnified. Fig. 1*b*, same, viewed sideways. Fig. 1*d*, teeth of lower jaw and the tongue, natural size. Fig. 1*e*, outer teeth, magnified. Fig. 1*f*, scale from lateral line, magnified. Fig. 1*g*, scale from above lateral line, showing the minute serration, magnified. Fig. 1*h*, patch of scales from middle of body, natural size.

Frederick McCoy.



[illegible] [illegible] [illegible] litho Govt Printing Office

PLATE 74.

CARCHARODON RONDELETII (MÜL. AND HEN.).

THE WHITE SHARK.

[Genus CARCHARODON (A. SMITH). (Sub-kingd. Vertebrata. Class Pisces. Order Plagiostomata. Sub-order Selachoidea. Family Lamnidæ.)

Gen. Char.—First dorsal fin over the space between the pectoral and ventral fins; second dorsal and anal fins nearly equal and very small. A pit at upper and under side of base of caudal fin. Caudal fin crescentic, from having a large, pointed lower lobe two-thirds the length of the upper one. Sides of the tail keeled. No nictitating eyelid. Spiracles very small or absent. Teeth large, flat, triangular, equilateral, serrated on the edges, base hollow, without ridge, alike in both jaws, but those of lower jaw narrower; no median tooth. Scales minute, with three keels. Gill-openings wide. Cosmopolitan.]

DESCRIPTION.—*Form:* Elongate, fusiform; snout sub-triangular, rounded at the point; nostrils large, about midway between tip of snout and mouth, rather nearer to the eye. Spiracles a minute pore on each side, level with the general surface, a little below the eye and behind the mouth. Gill-openings very large. Anterior edge of 1st dorsal behind the posterior edge of pectoral; second dorsal very small, its posterior edge just over the anterior edge of equally small anal fin. A strong longitudinal keel on each side of tail, with a deep oval pit on midline over their posterior third. Caudal large, crescentic, the lower lobe pointed like the upper lobe and almost equally large. *Teeth:* Very large, broad, triangular, with a thin-edged hollow base, coarsely serrated on the sides; third upper tooth on each side much smaller than the second or fourth, on each side above and below. *Colour:* Ashy brownish-grey above, paler below.

MEASUREMENTS.	Ft.	ins.	lines.
Total length to end of upper lobe of caudal	16	2	0
„ „ middle of caudal	15	0	0
Length from snout to origin of dorsal	5	6	0
„ of base of dorsal	1	4	0
Height of dorsal	1	11	0
Length from snout to anterior base of 2nd dorsal	10	5	6
„ of base of 2nd dorsal	0	2	6
Height of anterior part of 2nd dorsal	0	4	6
„ posterior lobe	0	2	3
Length of lateral tail ridge	1	8	0
Length from anterior origin of base of caudal fin to tip of upper lobe	2	10	0
Depth of lower lobe of caudal	1	6	0
Length from snout to anterior base of pectoral	4	3	0
„ of base of pectoral	1	2	0
„ of anterior margin of pectoral	3	0	0
„ from posterior base of 2nd dorsal to origin of caudal	1	11	0
„ from posterior base of anal to origin of caudal ...	1	6	0
„ from hind edge of ventral to anterior edge of anal ...	1	10	0
„ „ pectoral to anterior edge of ventral	3	9	0
„ of base of ventral	0	9	0
„ of anterior margin of ventral	0	8	0

MEASUREMENTS—*continued.*	Ft.	ins.	lines.
Length from snout to anterior edge of base of anal fin	8	9	0
„ of base of anal	0	2	6
„ of anterior margin of anal	0	4	6
„ from tip of snout to upper edge of nostril	0	7	0
„ „ „ anterior edge of orbit	0	10	0
„ „ „ spiracle	1	8	6
„ of orbit	0	1	10
„ of nostril	0	2	5
Diameter of spiracle	0	0	2
Width of mouth	1	4	0
Length of 1st tooth	0	1	5
Width at base	0	1	3
Length of 2nd tooth	0	1	7
Width at base	0	1	5
Length of 3rd tooth	0	1	0
Width at base	0	0	10
Length of 4th tooth	0	1	6
Width at base	0	1	3
Length from tip of snout to middle of front edge of mouth	0	10	0
„ of 1st gill-opening	1	5	6
„ of 2nd gill-opening	1	7	6
Girth	7	6	0
Length of 1st lower tooth	0	1	3
Width at base	0	0	10

Serratures, about 10 in 6 lines, closer near point, slightly irregular.

REFERENCE.—(Müller and Henle) Plagiost. p. 70 = *Carcharodon lamia* (Bonap.) F. I. = *Carcharias verus* (Ag.) Poiss. Foss. vol. 3, p. 91, t. F. fig. 3; ? = *Carcharodon Capensis* (Smith) Zool. S. Africa, Pisces t. 4.*

This gigantic Shark is by far the largest and most formidable of those approaching our shores, one specimen in the Museum being thirteen feet three inches long, and another between fifteen and sixteen feet long, and some having been killed upwards of thirty feet long. Our two specimens were caught, one in July, 1873, and one in April, 1877, in Hobson's Bay, near Brighton. The larger had been observed for several days swimming round the ladies' baths, looking in through the picket fence in such a disagreeable manner that the station master had a strong hook and iron chain made so as to keep the rope out of reach of his teeth, and this, being baited with a large piece of pork, made to look as much like a piece of a lady as possible, was swallowed greedily ; and then, with the aid of a crowd of helpers, the monster was got on shore. On opening the stomach, amongst a load of partially digested objects, a large Newfoundland dog was found, with his collar on, identifying him as one lost the day before, no doubt swallowed when enjoying a swim in the comparatively shallow water in which the Shark was repeatedly seen and at last caught.

---

* Dr. Smith's figure of his *C. Capensis* must be bad, as it shows no anal fin, and I am doubtful whether the other differences between his figure and mine may be errors also, or whether, consequently, his species be a peculiar new one, or referable to this old one.

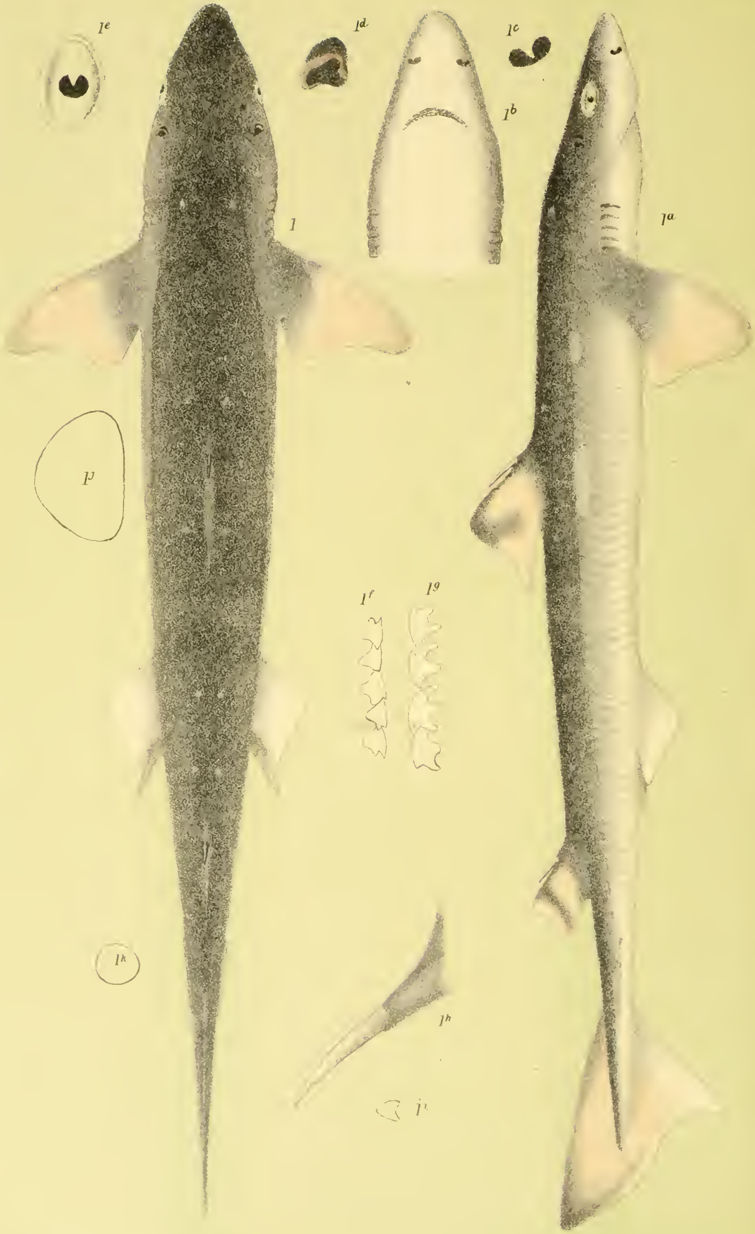
Dr. Günther has suggested the name "Great Blue Shark" for the present species, but as its colour is not strikingly blue, but rather whitish, the old English name of "White Shark" had perhaps better be adhered to, although no doubt, as Duméril complains, more than one species seem to have been confounded by English writers, and sailors in many waters, under this name. The present fish, however, has the best claim to the name, and is probably also the *Carcharias* of the old Greek writers. There can be no doubt that our fish, here figured, is the same as the terrible "White Shark" sometimes found on the English coasts, and more common in the West Indies; probably the most dreaded by sailors of all Sharks from its great size, strength, and ferocity. The fearful armature of the mouth with rows of great triangular serrated teeth renders any wound fatal; and the size, even in our waters, is often so great that a man could be swallowed whole with ease, as Capt. King mentions in his Survey of Australia; Blumenbach, the famous anatomist, who was a perfectly trustworthy authority, mentions a whole horse being found in one. When fishermen are drawing their nets full of fish, this Shark will swim along, giving every now and then a half-turn and biting out a large mouthful of fishes and net, and swallowing them together. It was from representations by fishermen and their friends of the damage done to them and the destruction of fish, as well as danger to bathers when these fish and the great Bull Shark or Shovel-nosed Shark (*Odontaspis taurus*) appeared, that the Government was induced to place large sums on the Estimates for their destruction; paying by measurement for hundreds of the harmless blunt-toothed Smooth Hound, Picked Dog-fish, and other small Sharks, as the young of these monsters.

This is the first recognisable figure of this famous Shark. Couch's figure has the lower lobe of the caudal fin too small, and the anal and second dorsal much too large and too far back. Smith's figure gives the proper shape of tail, but no anal fin. Yarrell's figures are not worthy of note; and even the best of them all, that by the Prince of Canino (Fauna Italica), has the pectoral and dorsal fins larger and more deeply notched, and the lower lobe of the tail smaller than in our sketch carefully measured from life.

EXPLANATION OF FIGURES.

PLATE 74.—Fig. 1, side view (the + and dotted line mark the small spiracle). Fig. 1*a*, underside of head. Fig. 1*b*, one of the teeth, natural size. Fig. 1*c*, reduced view of the rows of teeth on one side of upper and lower jaws, the arrow marking the front middle point of each, which is without tooth. Fig. 1*d*, reduced side view of outer row of teeth of upper jaw, to show the small relative size of the third one. Fig. 1*e*, corresponding view of lower row. Fig. 1*f*, serration of one side of tooth, magnified, to show its irregularity. Fig. 1*g*, pit at base of tail. Fig. 2, portion of tooth, broken, showing the hollow base.

FREDERICK McCOY.


1^{e}
1^{d}
1^{c}
1^{b}
1
1^{a}
1^{j}
1^{f}
1^{g}
1^{k}
1^{h}
1^{i}

[illegible] [illegible] [illegible]

PLATE 75.

ACANTHIAS VULGARIS (LINN. SP.).

THE PICKED DOG-FISH.

[Genus ACANTHIAS (MÜLLER and HENLE). (Sub-kingd. Vertebrata. Class Pisces. Order Plagiostomata. Sub-order Selachoidea. Family Spinacidæ.)

Gen. Char.—Elongate, slender. Two dorsal fins, each with a smooth, bony spine on front edge; pectorals moderate; ventral fins a little in front of posterior dorsal; no anal fin; caudal fin with a very wide, unnotched upper lobe, divided near the middle by the straight end of the body, which is not turned up; lower lobe small, pointed; mouth moderately arched, a long, straight, oblique groove on each side of mouth, but no labial fold; teeth rather small, alike in both jaws, points so much bent backwards that the anterior side forms a straight, horizontal, upper and lower cutting edge; no nictitating membrane; spiracles very large, a little behind the eye; gill-openings small, in front of base of pectoral; a distinct keel on each side of tail. Cosmopolitan.]

DESCRIPTION.—Slender, tapering; snout moderately tapering, narrow, rounded in front; mouth small, moderately arched, width three-fourths of the distance from tip of snout to its middle; nostrils nearer to tip of snout than to mouth; eye large; antero-posterior diameter about half the distance from the anterior edge to tip of snout; spiracles very large. Gill-openings small, the last one over the anterior edge of the base of the pectoral. Pectoral fin short, broad; anterior edge of first dorsal distinctly behind the vertical of the inner posterior angle of pectoral; posterior angle acutely pointed; second dorsal smaller, with posterior angle acutely prolonged. Spines of the two dorsals smooth, moderately arched, sharp at apex, moderately compressed, posterior one longer than the anterior, obtuse in front, hollowed behind, with two sharp, cutting, posterior lateral edges; ventrals covering the vent, terminating a little in advance of the anterior edge of second dorsal; caudal broad, upper lobe ovate, without notch, lower lobe short, pointed. *Colour:* Above ash-grey, with a few irregular white spots, most distinct in the young; below white; fins with a slight brownish tinge, and the dorsals and caudal with an indistinct blackish hue near tip; eye pale-green. Teeth about 4 in six lines near middle of jaw, about 1 line high, each with a tri-lobed base, and the conical sharp-pointed apex directed so completely backwards that the anterior edge forms a nearly horizontal, slightly convex, sharp, cutting edge.

MEASUREMENTS.	MALE.			FEMALE.		
	Ft.	ins.	lines.	Ft.	ins.	lines.
Total length to end of upper lobe of caudal ...	2	3	6	3	0	0
Length from snout to origin of 1st dorsal ...	0	9	3	1	0	3
„ of base of 1st dorsal	0	1	9	0	2	5
Height of 1st dorsal	0	1	9	0	2	5
Length from snout to anterior base of 2nd dorsal	1	6	6	1	11	0
„ of base of 2nd dorsal	0	1	3	0	1	9
Height of anterior part of 2nd dorsal	0	1	1	0	1	9
Length of posterior lobe of 2nd dorsal ...	0	1	3	0	1	7
„ from anterior origin of base of caudal fin to tip of upper lobe	0	4	7	0	6	3
Depth of lower lobe of caudal	0	1	10	0	3	0

MEASUREMENTS—*continued.*	MALE.			FEMALE.		
	Ft.	ins.	lines.	Ft.	ins.	lines.
Length from snout to anterior base of pectoral...	0	5	10	0	7	6
„ of base of pectoral...	0	1	3	0	2	0
„ of anterior margin of pectoral ...	0	3	0	0	4	6
Greatest girth of pectoral	0	2	5	0	3	1
Length from posterior base of 2nd dorsal to origin of caudal	0	3	5	0	4	3
„ of hind edge of pectoral to anterior edge of ventral	0	7	4	0	9	6
„ of base of ventral	0	1	9	0	2	2
„ of anterior margin of ventral... ...	0	1	5	0	2	2
„ from tip of snout to upper edge of nostril	0	1	3	0	1	6
„ „ „ anterior edge of orbit	0	1	9	0	2	3
„ „ „ spiracle	0	2	9	0	3	8
„ of orbit	0	0	10	0	1	1
„ of nostril	0	0	3	0	0	4
Diameter of spiracle	0	0	4	0	0	4
Width of mouth	0	1	8	0	2	1
Length from tip of snout to middle of front edge of mouth	0	2	1	0	2	9
Length of 1st gill-opening	0	0	4	0	0	6
Girth	0	7	6	1	0	0
Length of exposed portion of posterior dorsal spine	0	1	0		—	
Width at base	0	0	2	0	0	2
Length of exposed portion of anterior dorsal spine		—		0	1	0

Size of scales about middle of body, nineteen in 3 lines.

REFERENCE.— = *Squalus acanthias* (Lin.), Syst. Nat. t. 1, p. 597; id. Bloch, t. lxxxv. = *Acanthias vulgaris*, Bonaparte, Cat. Pesci Europ. p. 15.

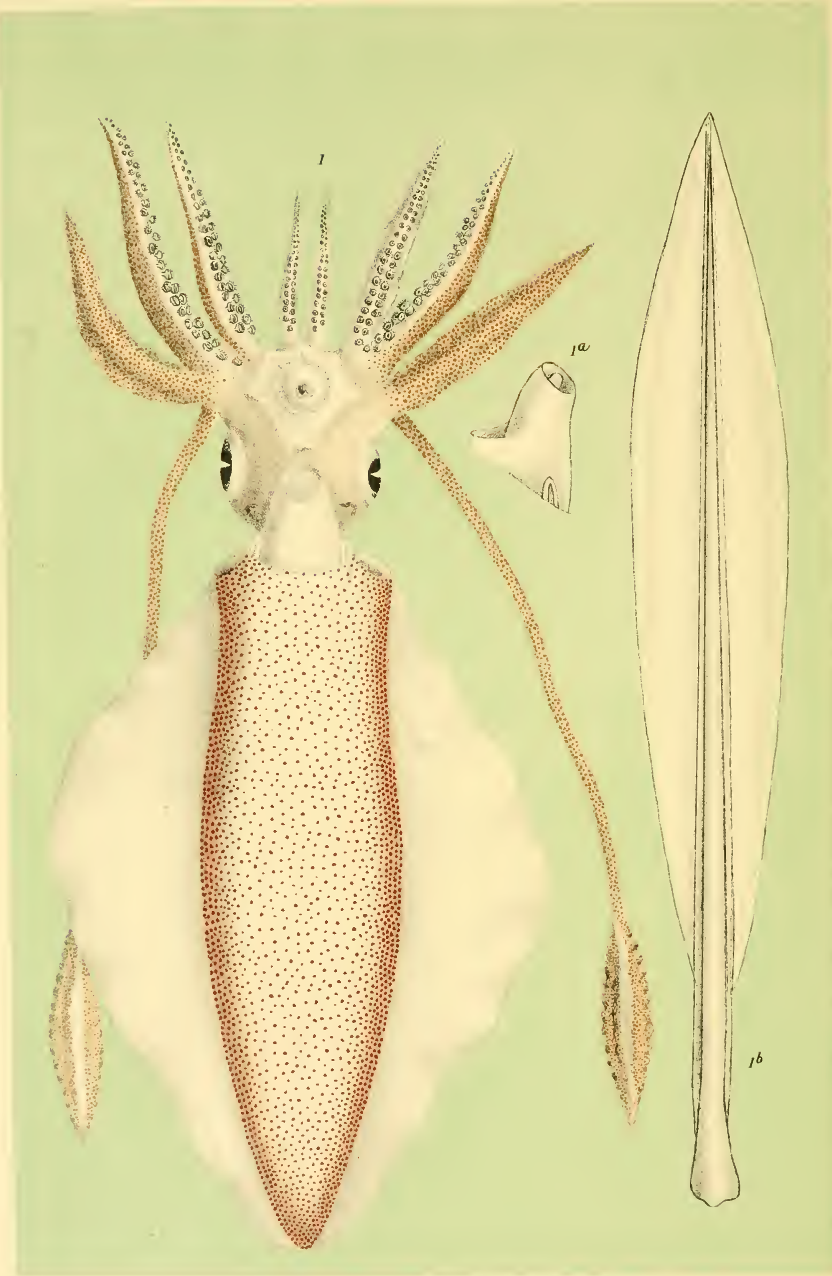
This little Dog-fish, which rarely exceeds two feet in length, is easily distinguished by the bony spines in front of the two dorsal fins, the absence of anal fin; and the posterior termination of the tail in the same line as the body, instead of being abruptly turned up as in most sharks. As at home, it seems to bring forth its living young almost every day throughout all the warmer months of the year, each about 5 inches long, with a very large fig-shaped egg-bag hanging from it, 1½ inches in diameter and upwards of 2 inches long. Their spines are much dreaded by the fishermen, from the painful wounds they can inflict with them; always painful and difficult to heal, and sometimes producing lockjaw. When hooked or tangled by the head in a net they bend the tail over the head, and, suddenly lashing out straight, cut the cords and escape, or tear open a man's hand touching their head, with the sharp lateral edges of the dorsal spines; the larger spine of the 2nd dorsal on the more flexible tail being the more effective.

I can find no difference between the English fish and ours on careful comparison of specimens, and I find the 1st dorsal as much behind the pectoral in a Cornish specimen as in those from Hobson's Bay; but it is by no means so abundant here as in Cornwall, where twenty thousand were counted by Couch in one cast of the sea net.

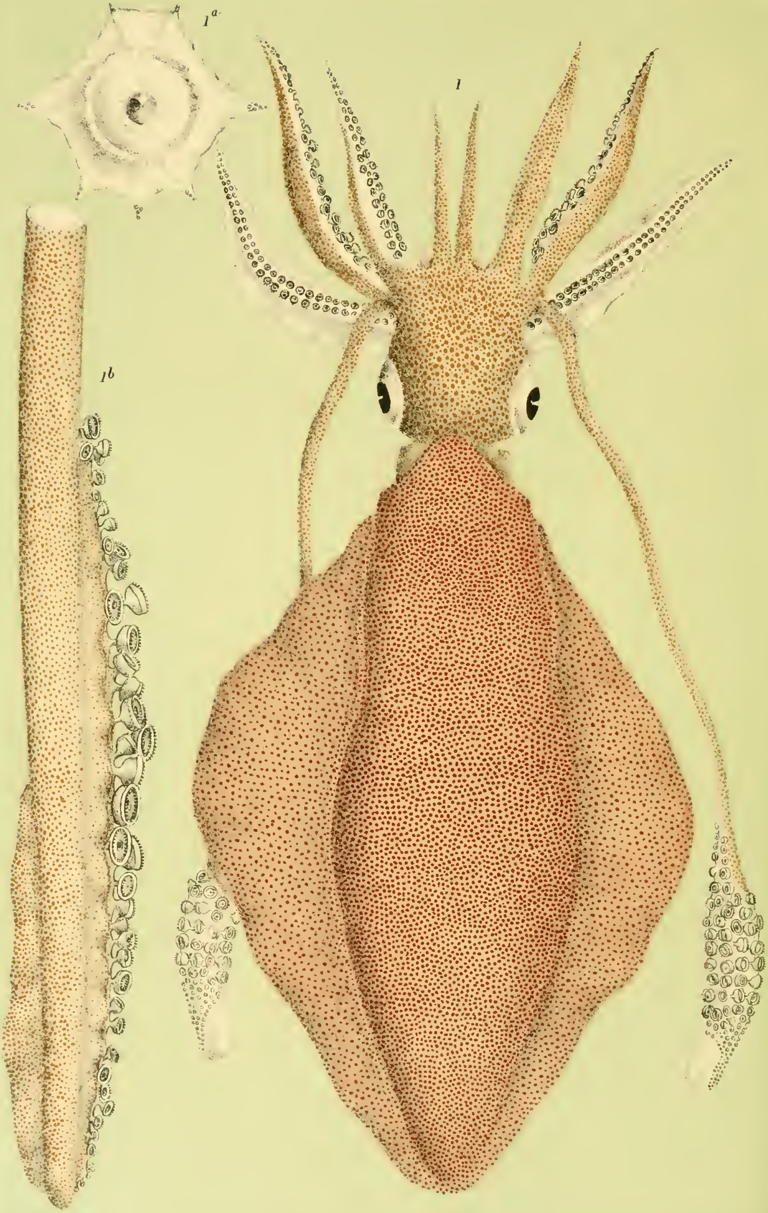
EXPLANATION OF FIGURES.

PLATE 75.—Fig. 1, dorsal view of male, reduced. Fig. 1*a*, side view of same specimen. Fig. 1*b*, under-side of head, to show the mouth and nostrils. Fig. 1*c*, nostril, with valve. Fig. 1*d*, spiracle. Fig. 1*e*, eye. Fig. 1*f*, teeth of upper jaw. Fig. 1*g*, teeth of lower jaw. Fig. 1*h*, posterior spine, natural size. Fig. 1*i*, transverse section of spine. Fig. 1*j*, section of body. Fig. 1*k*, section of tail.

FREDERICK MCCOY.



A Bartholomew del et lith Prof Mc Coy direxᵗ Steam litho Govt Printing Office



A Bartholomew del et lith.   Prof. McCoy direx^t Steam litho. Govt. Printing Office

PLATES 76 AND 77.

SEPIOTEUTHIS AUSTRALIS (QUOY AND GAIM.).

THE AUSTRALIAN TOOTH-CUPPED CUTTLEFISH.

[Genus SEPIOTEUTHIS (FÉR.). (Sub-kingd. Mollusca. Class Cephalopoda. Sub-class Antipedia. Order Sephinia. Fam. Loligidæ.)

Gen. Char.—Body oblong, sub-cylindrical, moderately depressed; fins extending nearly the length of the body on sides of back; suspending cartilaginous buttons on ventral surface linear, cervical ridge linear; head large; buccal membrane with seven salient angles; six buccal aquiferous openings; external ear with a prominent transverse crest; sessile arms conical, tapering, unequal, usually with narrow marginal fins; suckers in two rows. Tentacular arms long, cylindrical, with a club-shaped distal end having four rows of suckers with a narrow membranous fin on each side, and one on the compressed back; siphuncle supported by two dorsal triangular membranes at base. Shell, internal, horny, as long as the back, lanceolate, narrow in front, with a central keel.]

DESCRIPTION.—Body sub-cylindrical, tapering, with very broad, thick, fleshy, ovato-rhombic fins extending nearly the entire length of the mantle from beyond the posterior apex to within a short distance of the anterior edge, equalling the width of the body in the middle; anterior edge of mantle separated from the head all round, projecting in two rounded acute angles on the ventral aspect, corresponding with the internal, cartilaginous ridges, and projecting in one central, rounded point on the nape; funnel large, with a distinct valve and two strong, cartilaginous channels at ventral aspect of lateral base, with two triangular, suspensory membranes on dorsal side at base; sessile arms having the dorsal pair shortest, the next longer, the next longest, and the ventral pair equalling the second dorsal ones in length, each having two rows of pedunculated cups with horny, toothed margins; each arm connected by a very slight web at base about two lines wide; the first or smallest dorsal arms rounded on the back without webs; second pair rounded on the back, with a web two lines wide on each side not reaching to the base; the third pair are largest, compressed, keeled, with narrow web bordering the suckers; fourth or anterior pair rounded, with thick lateral webs, broader on outer side. *Colour:* Whole back, body and fins, vinous brownish-red with darker dots and small spots, the under-side of the body similarly coloured on the sides, but with paler smaller spots on the middle; under-side of lateral fins milk-white; head and outer-side of arms spotted like the back, but lighter and browner than the back, not so vinous or reddish in tint; inner-side of the arms, cups, and buccal membrane, and parts about the mouth milk-white; the eyes have a silvery-white iris about four lines wide, surrounded by a band, one line wide, of rich bronze yellowish-brown, beyond which is five or six lines wide of rich brown dotting, darker than head. Length of body, exclusive of head, 1 foot 3 inches; width across middle of body and lateral fins 11 inches; length of tentacular arms 1 foot 4 inches from base to tip; the cupped distal expansion is 5 inches long and 7 lines wide, stem 4 lines wide; length of dorsal pair of arms 4 inches, next pair 5 inches, next pair 6 inches 3 lines, fourth or anterior pair 5 inches; eye 2 inches in diameter; diameter of cups on tentacular arms 3 lines. Internal shell (or pen) of the colour and consistence of a goose-quill, extending the whole length of mantle, total length 1 foot 1½ inches; the anterior 5th forming a narrow parallel-sided stem 3 inches long and 7 lines wide, with an obtusely-angular anterior end; posterior ⅘ths oval, gradually widening to about the middle, and rather more rapidly tapering to the posterior point; the inflexion forming the medial keel 3 lines wide; greatest width of pen 2 inches.

Cups with slender peduncles, horny margins, with very numerous, close, acute teeth, all whitish; the cups on the clubbed part of tentacular arms in four rows at the middle and three rows towards the end; on eight sessile arms in two rows; on the seven salient angles of the buccal membrane varying from 3 to 5 small cups in one or two rows.

Tentacular arms with a broad thin membranous band 5 lines wide, extending about 2½ inches from the base, and having a thicker, narrower web on compressed keel on back of cupped expansion, and one on each side of the rows of cups.

External ears with prominent fleshy crests. Beaks black.

REFERENCE.—Quoy and Gaimard, Voy. Astrol. Zool. ii. 77, t. 4, f. 1.

The enormous eyes of this Cuttlefish (as big as those of a calf in the specimen figured) roll about in their sockets in a way so suggestive of a vertebrate animal of the higher types, and give such an air of bright, energetic intelligence and activity to this fierce, predaceous creature, that it is difficult for an observer, unacquainted with its structure, to realise the fact of its belonging to so lowly a division of the animal kingdom as the Mollusca. It is one of the rarer Cuttlefishes of our Bay, the specimen described and figured having been obtained during the submarine blasting operations for removing rocks from the channels within the Heads, near Queenscliff. The anterior end of the internal pen or shell is more angular, and the widening behind is more gradual or less abrupt, than in Quoy and Gaimard's outline; the whole substance of the pen is thin and flexible, without thickening at the edges, and even the keel or midrib is only an inflexion, rounded on one face and hollow on the other.

LOCALITY.—Not uncommon in Port Phillip Bay.

EXPLANATION OF FIGURES.

PLATE 76.—Fig. 1, view of under-side, reduced to one-third the natural size, showing the funnel, mouth, and buccal membrane. Fig. 1*a*, side view of funnel, showing internal valve, suspensary ligaments, and one of the lateral cartilaginous buttons for supporting the edge of the mantle, Fig. 1*b*, internal dorsal pen, one-half the natural size (posterior end up).

PLATE 77.—Fig. 1, dorsal view, one-third the natural size. Fig. 1*a*, buccal membrane, one-half the natural size, showing the beaks in the middle, and the irregular clusters of small suckers at angles. Fig. 1*b*, side view of end of one of the long tentacular arms, natural size, showing the toothed and pedunculate cups, and the dorsal and lateral fins or crests.

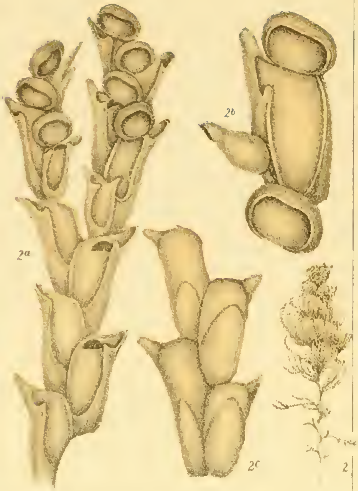
FREDERICK McCOY.

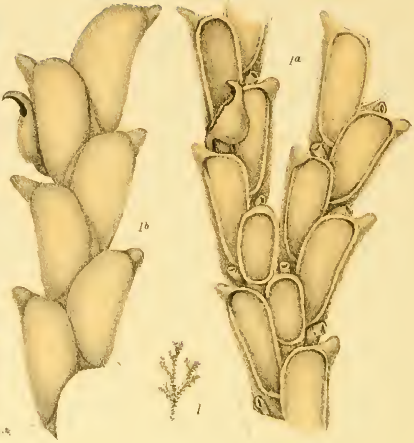
78
Magu

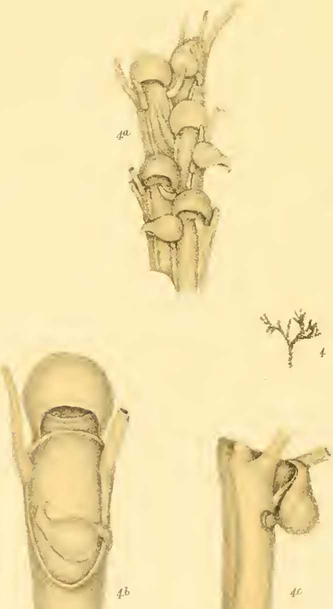
Pl. 78

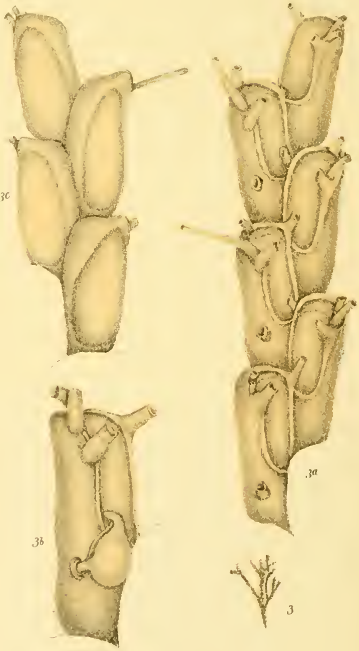
ZOOLOGY OF VICTORIA

(Polyzoa.)









J. Ripper del et lith. Prof. M^c Coy direx^t Steam litho Govt. Printing Office.

PLATE 78, FIG. 1.

BUGULA ROBUSTA (P. McGILL.).

[Genus BUGULA (OKEN). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Fam. Bicellariidæ.)

Gen. Char.—Cells bi-multiserial, closely contiguous; aperture very large, directed forwards; the margins not at all or very slightly thickened.]

DESCRIPTION.—Cells biserial, contracted below, upper and outer angle produced into a short, hollow, conical process; aperture oval, not extending to the base; a large, capitate avicularium on the lower part of the cell, below and to the outer side of the aperture.

REFERENCE.—P. H. MacGillivray, Trans. Roy. Soc. Victoria 1869.

Western Port.

The only specimen I have seen forms a tuft, of a greyish-brown color, nearly two inches high. It is readily distinguished by the large size of the cells, with the upper and outer angles produced into the stout, conical processes, as well as the situation of the large avicularia.

EXPLANATION OF FIGURES.

Fig. 1, portion, natural size. Fig. 1*a*, small piece, magnified. Fig. 1*b*, back, magnified.

PLATE 78, FIG. 2.

BUGULA CUCULLATA (BUSK).

DESCRIPTION.—Polyzoary arranged in a spiral or turbinate form; cells biserial, elongated; upper and outer angle produced into a pointed spine, below which there is a smaller spine projecting also upwards and outwards; inner angle nearly square or prolonged into a minute spine; aperture occupying about two-thirds of the front of the cell; avicularia capitate, at the outer and lower part of the cell; ovicell large, saucer-shaped (when dry).

REFERENCE.—Busk, Journal of Microscop. Science, 1867, p. 241.

Queenscliff; Portland, Mr. Maplestone.

Forms elegant tufts, two or three inches high. The cells are usually in small branches, forming fan-shaped tufts, spirally arranged round the axis. The aperture occupies about two-thirds of the front, and the edge is prolonged into two short spines, the upper one at the extreme angle being the larger ; the inner angle is nearly square or produced into a slight spine. The ovicells are large, in dry specimens cucullate or saucer-shaped, but said by Mr. Maplestone to be globular when alive.

EXPLANATION OF FIGURES.

Fig. 2, specimen, natural size. Fig. 2*a*, front view of portion, magnified. Fig. 2*b*, single cell, more highly magnified, showing ovicells and avicularium. Fig. 2*c*, back view of fragment, magnified.

PLATE 78, FIG. 3.

BUGULA DENTATA (LAMX.).

DESCRIPTION.—Cells biserial, elongated; three long, hollow spines at the upper and outer part of the aperture, and a single similar one at the inner angle; aperture occupying rather more than half of the front of the cell; avicularia large, articulated below and to the outside of the lower corner of the aperture.

REFERENCE.—Busk, Brit. Mus. Cat., Mar. Polyzoa, p. 46, pl. xxxv.

Queenscliff ; Hobson's Bay.

This species occurs in small tufts, of a dull-greenish or leaden colour, on piles, hulks, &c. It is at once recognised by the three long spines at and below the upper and outer angle of the aperture ; of these the lower is turned inwards, while the upper two project forwards or outwards. There is also a similar but smaller spine at the upper and inner angle. I have not seen the ovicells ; they are said to be blue.

Lamouroux describes his *B. dentata* as having only two spines, but I think there can be no doubt it is the species here described.

EXPLANATION OF FIGURES.

Fig. 3, fragment, natural size. Fig. 3*a*, front view, magnified. Fig. 3*b*, side of cell, showing an avicularium. Fig. 3*c*, back view, magnified.

PLATE 78, FIG. 4.

BUGULA AVICULARIA (PALL.).

DESCRIPTION.—Cells biserial, elongated, small; two spines at the upper and outer angle, and one at the inner; aperture occupying the greater part of the anterior surface; avicularia small, capitate, situated on the outer side, close to the margin of the aperture, and at about its middle; ovicell surmounting a cell, rounded, rather contracted below.

REFERENCE.—Busk, Brit. Mus. Cat., Mar. Polyzoa, p. 45, pl. liii.

Hobson's Bay, on piles and hulks.

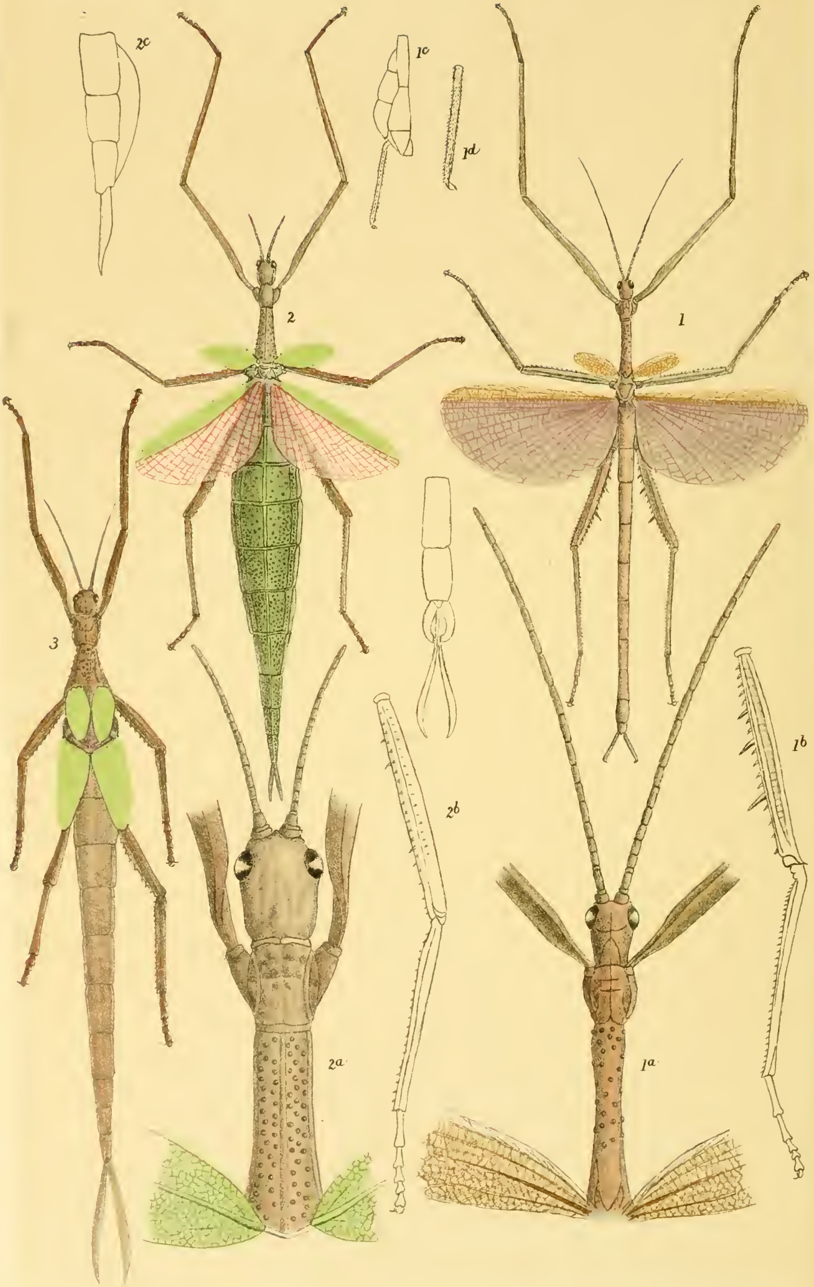
There can, I think, be no doubt of the identity of this with the well-known European species. It may be distinguished by the small size of the cells, the number and form of the spines, the shape of the ovicells, and the situation of the avicularia.

EXPLANATION OF FIGURES.

Fig. 4, fragment, natural size. Fig. 4*a*, front view of portion, magnified. Fig. 4*b*, single cell, showing ovicell and avicularium, more highly magnified. Fig. 4*c*, side view of cell.

I am indebted to Dr. MacGillivray for the typical specimens and descriptions of the species of *Bugula* on this plate.

FREDERICK McCOY.



A Bartholomew del et lith
Prof Mc Coy direxit
Steam litho Govt Printing Office

PLATE 79, FIGS. 1 AND 2.

ACROPHYLLA VIOLASCENS (LEACH SP.).

THE VIOLET-WINGED PHASMA.

[Genus ACROPHYLLA (GRAY). Sub-kingd. Articulata. Class Insecta. Order Orthoptera. Section Ambulatoria. Family Phasmidæ. Sub-fam. Pterophasmina.)

Gen. Char.—Body elongate, abdomen slender and cylindrical in the males, broader, fusiform and depressed in the females; ovipositor of female boat-shaped, keeled below, not exceeding the end of the abdomen; anal styles long, those of males often narrower than of females. Thorax long, cylindrical; mesothorax about three times as long as the prothorax, usually spined; metathorax shorter than the mesothorax. Head small, elongate, gibbous behind; antennæ long, setaceous, many jointed, pubescent in the males; eyes globose, prominent; three ocelli or none. Tegmina ovate, about half or one-third as long as the wings; wings moderate in both sexes, longer in the males. Legs long, slender (longer in the males), dentated, anterior pair largest, simple; femora narrow, not membranous, anterior pair notched on inner edge to fit head; hind tibiæ not strongly dentate within. Tarsi with 1st joint much longer than the others, the three next gradually diminishing, 5th longer than the 4th; claws strong, with large pad. Australia.]

DESCRIPTION.—*Male:* Colour: Dull-green, the anterior portion of tegmina and anterior margin of costal area bright-green; posterior of tegmina and costal area, abdomen, and femora yellowish-brown; membranous portion of hind wings violet-purple, with the veins of a stronger shade of the same colour. Mesothorax above, and under-side of meso- and meta-thorax rough, with close small granular tubercles. Anterior legs simple, femora of middle pair with two denticulated lateral ridges, and a median granular keel below; hind femora with two denticulate lateral ridges, the median angular ridge only slightly serrated, but with two large, slender, conical spines nearly as long as width of thigh, and dividing the length into thirds. First joint of tarsi nearly as long as all the others; antennæ 21-jointed slightly pubescent, anal styles moderate, flat, narrow. Length from base of antennæ to tip of abdomen (excluding anal styles) 3 inches 3 lines. Proportional measurements to length, taken as 100:—Length of head, $\frac{7}{100}$; antennæ, $\frac{30}{100}$; prothorax, $\frac{7}{100}$; mesothorax, $\frac{16}{100}$; metathorax, $\frac{13}{100}$; abdomen, $\frac{62}{100}$; width of abdomen, $\frac{5}{100}$; anal styles, $\frac{9}{100}$; tegmina, $\frac{12}{100}$; width of tegmina, $\frac{7}{100}$; length of one wing, $\frac{35}{100}$; width of costal area, $\frac{5}{100}$; greatest width of wing, $\frac{24}{100}$; length of anterior femora, $\frac{30}{100}$; of second pair, $\frac{21}{100}$; of hind femora, $\frac{25}{100}$; width of hind femora, $\frac{4}{100}$.

Female: Colour: Whole body, legs, tegmina, and costal area of wings bright pea-green, except the under-sides of the legs, which are dull reddish; membrane of wings pale rose pink, veins more strongly tinted with the same colour; a whitish or pinkish band along each side of mesothorax and metathorax below the keel of the wings; mesothorax rough with small granules, and with a narrow median keel, narrow in front; under-side of meso- and meta-thorax granular; antennæ short, 21-jointed, smooth; abdomen large, broad in the middle, tapering, granular, carinated; tegmina and costal area of wing broad ovate, wide in the middle, tapering to a distal point; anal styles moderately small; denticulation of two hind pairs of femora nearly as in the males, but smaller. Length from base of antennæ to tip of abdomen (excluding anal styles) 3 inches 2 lines. Proportional measurements to length, taken as 100:—Length of head, $\frac{9}{100}$; antennæ, $\frac{15}{100}$; prothorax, $\frac{6}{100}$; mesothorax, $\frac{15}{100}$; metathorax, $\frac{14}{100}$; abdomen, $\frac{65}{100}$; width of abdomen, $\frac{15}{100}$; anal styles, $\frac{10}{100}$;

tegmina, $\frac{14}{100}$; width of tegmina, $\frac{8}{100}$; length of one wing, $\frac{32}{100}$; width of costal area, $\frac{10}{100}$; greatest width of wing, $\frac{22}{100}$; length of anterior femora, $\frac{28}{100}$; second femora, $\frac{22}{100}$; hind femora, $\frac{24}{100}$; width of hind femora, $\frac{4}{100}$.

REFERENCE.— = *Phasma violascens*, Leach, Zool. Misc., v. 1, t. 9 (male) = *Diura roseipennis*, Gray, Ent. Aust., t. 7, f. 2 (female).

The Phasmæ of the genus *Acrophylla* generally have three ocelli on top of the head, but *A. violascens* has none; the great length of the mesothorax, compared with the prothorax, is very remarkable in these insects. The anal styles vary much in length and width in the tropical species, but are only very moderate and nearly alike in both sexes in *A. violascens.* The deep violet colour of the under-wings in the males is so curiously different from the rosy pink of the same part in the females that no one would guess they were sexes of the same species if it had not been a matter of observation beyond doubt; the carination of the mesothorax in the one sex and not in the other is a very unusual sexual difference. The yellow bases of the costal area and yellow stripes on abdomen of females, mentioned by Westwood, are only *post-mortem* appearances, not seen in life, or unless the tegmina after death be allowed to remain over the costal area, or the wings be allowed to rest for some time on the abdomen.

Not very uncommon at Oakleigh, near Melbourne.

A large variety, 3 inches 6 lines long (male), with stouter legs and paler wings, occurs at Warragul, and females found therewith have the wings colourless; but they seem to be only local varieties.

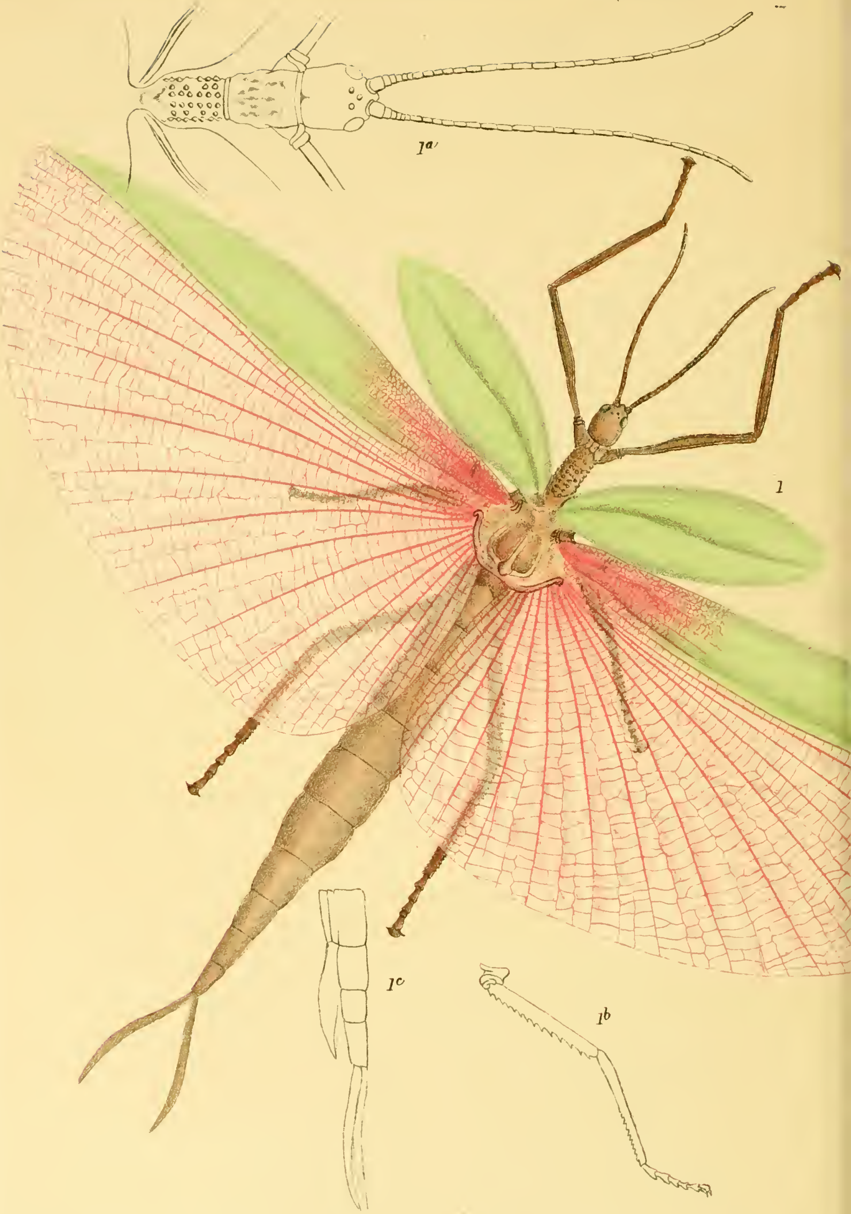
EXPLANATION OF FIGURES.

PLATE 79.—Fig. 1, male specimen, flying, natural size. Fig. 1*a*, antennæ, head, prothorax, and mesothorax, magnified. Fig. 1*b*, hind leg, magnified, showing the large teeth. Fig. 1*c*, side view of posterior joints of abdomen, magnified. Fig. 1*d*, one of anal styles, further magnified; Fig. 1*e*, view of posterior end of abdomen, magnified, view from above. Fig. 2, female, natural size. Fig. 2*a*, ditto, antennæ, head, prothorax, and keeled mesothorax, magnified. Fig. 2*b*, ditto, hind leg, magnified. Fig. 2*c*, ditto, side view of hind segments of abdomen, magnified to show ovipositor. Fig. 3, *Podacanthus Typhon,* young specimen, with undeveloped wings, natural size; the left hind leg is shorter than that of the other side, and has only four joints in the tarsus, from having been lost and being in progress of restoration. (See Plate 80 for adult.)

FREDERICK McCOY.

ZOOLOGY OF VICTORIA

(Insects)



A Bartholomew del et lith   Prof McCoy direxᵗ   Steam litho Govt. Printing Office

PLATE 80.

PODACANTHUS TYPHON (GRAY).

THE LARGE PINK-WINGED PHASMA.

[Genus PODACANTHUS (GRAY). (Sub-kingd. Articulata. Class Insecta. Order Orthoptera. Section Ambulatoria. Family Phasmidæ. Sub-fam. Pterophasmina.)

Gen. Char.—Body large, abdomen cylindrical, slender, truncated at tip, and biuncinate below in males; very thick, tapering to tip in females. Ovipositor large, boat-shaped, carinated below, pointed behind; styles very long, slender in both sexes, exceeding the length of the ovipositor in females. Head small, oblong, flat above, a little gibbous behind; eyes globular; three distinct ocelli on top of head. Antennæ long, filiform, 26-jointed and smooth in female, and one-third longer, pilose and of 23 joints in male. Mesothorax short, scarcely twice the length of the prothorax, narrow, rounded, spinose; metathorax longer than mesothorax, broad, oblong. Legs simple, of moderate length, thighs not membranous nor dilated, the two posterior pairs spinous below; the anterior pair notched on inner side for head, smooth; tarsal joints diminishing to the fourth, fifth long, claws large with large pad. Tegmina elongate, ovate, half length of wings in females, one-third length in males, reaching to about half the length of the abdomen; posterior wings very large, as long as abdomen, broadly rounded. Australia.]

DESCRIPTION.—*Female:* Tegmina, and distal half of costal area of under-wings, bright pea-green above; rather less than basal half of costal area above bright rosy-carmine; on the under-side the carmine extends along the anterior portion nearly three-fourths of the length from the base towards the tip, gradually fading into the bright pea-green of the lower and distal remainder of the area. Anterior basal portion of tegmina on the under-side pale-carmine, the remainder of the surface pea-green. Head, thorax, legs and abdomen pea-green, tinged with yellowish and pinkish on upper surface of abdomen, the tarsi, and tubercles of the mesothorax. Veins of the posterior part of lower wings rosy-carmine, with the membrane a paler shade of the same colour. Serratures of side of thorax and two posterior pairs of femora reddish. Tubercles of mesothorax irregular, conical. Head and prothorax and metathorax nearly smooth above; mesothorax and metathorax with a row of larger, more acutely pointed, tubercular spines. Two rows of small, sharp, subequal spines on the femora of the two posterior pairs of legs; anterior legs without spines. The midrib of the tegmina scarcely larger than the adjoining ones. Length from base of antennæ to end of abdomen, excluding the anal styles, 4 inches 6 lines to 5 inches 1 line. Proportional measurements to length, taken as 100 (in five specimens):—Length of head, $\frac{5-6}{100}$; antennæ, $\frac{27}{100}$; prothorax, $\frac{5-6}{100}$; mesothorax, $\frac{9-10}{100}$; metathorax, $\frac{19-20}{100}$; abdomen, $\frac{63}{100}$; width of abdomen, $\frac{10-12}{100}$; length of ovipositor, $\frac{16}{100}$; anal styles, $\frac{20}{100}$; tegmina, $\frac{37}{100}$; width of tegmina, $\frac{13}{100}$; length of one wing from base, $\frac{78-84}{100}$; greatest width of wing, $\frac{52}{100}$; width of costal area, $\frac{12}{100}$; length of anterior femora, $\frac{18}{100}$; width, $\frac{2}{100}$; length of 2nd femora, $\frac{14-15}{100}$; width, $\frac{2\frac{1}{2}}{100}$; length of hind femora, $\frac{20}{100}$; width, $\frac{2\frac{1}{2}}{100}$.

REFERENCE.—Gray, Ent. Aust. t. 2, f. 1.

This most beautiful *Phasma* is readily distinguished from the other two large species found near Melbourne, the *Tropidoderus rhodomus* and *T. iodomus*, figured in our Plates 69–70, by the beautiful rosy-pink colour of the membrane of the lower wings, with the bright rosy-carmine veins, and the same colour occupying as much of the basal portion of the costal area as can be covered over by the tegmina when at rest. It is also easily distinguished by the generic characters which separate the *Podacanthi* from the *Tropidoderi*, particularly the great length of the anal styles, the unkeeled tuberculated mesothorax, the three ocelli on the top of the head, and the undilated femora.

M. Serville, in his "Histoire Naturelle des Insectes, Orthoptères," p. 230, says that the antennæ of the females are longer than the thorax ; but in our specimens they but slightly exceed the metathorax and mesothorax taken together, without the prothorax. If the basal joint be counted, there are 27 joints in the antennæ, instead of 26, as given by Professor Westwood.

The number of spines on the hind legs varies, but is usually about a dozen.

I have not seen the males as yet, nor can I account for their apparent rarity.

Specimens are in the collection from the Richmond Paddock and other localities near Melbourne.

EXPLANATION OF FIGURES.

PLATE 80.—Fig. 1, female, natural size, in flying position. Fig. 1*a*, ditto, antennæ, head with the three ocelli, prothorax, and mesothorax, magnified. Fig. 1*b*, ditto, side view of leg. Fig. 1*c*, ditto, side view of hind joints of abdomen, to show ovipositor.

(N.B.—The young, with imperfectly developed wings, is figured in the resting position on Plate 79, fig. 3, and in it the ocelli are not visible.)

FREDERICK McCOY.

By Authority : JOHN FERRES, Government Printer, Melbourne.

CONTENTS OF DECADES.

N.B.—The originals of all the Figures are in the National Museum, Melbourne.

DECADE I.

Plate 1.—The Black Snake (Pseudechys porphyriacus, Shaw sp.).
Plate 2.—The Copper-head Snake (Hoplocephalus superbus, Günth.).
Plate 3.—The Tiger Snake (Hoplocephalus curtus, Schl. sp.).
Plate 4.—The Australian Bream (Chrysophrys Australis, Günth.).
Plate 5.—The Spiny-sided Butterfly-Gurnard (Lepidotrigla Vanessa, Rich. sp.).
Plate 6.—The Kumu Gurnard (Trigla Kumu, Lesson and Garn.).
Plate 7.—The Australian Giant Earth-worm (Megascolides Australis, McCoy).
Plate 8.—Lewin's Day-moth (Agarista Lewini, Boisd.).
    The Loranthus Day-moth (Agarista Casuarinæ, Scott).
    The Vine Day-moth (Agarista Glycine, Lewin sp.).
Plate 9.—Pieris (Thyca) Harpalyce (Don. sp.).
Plate 10.—Pieris (Thyca) Aganippe (Don. sp.).

DECADE II.

Plate 11.—The Little Whip Snake (Hoplocephalus flagellum, McCoy). The White-lipped Snake (Hoplocephalus coronoides, Günth.).
Plate 12.—The Death Adder (Acanthophis Antarctica, Shaw sp.).
Plate 13.—The Carpet Snake (Morelia variegata, Gray).
Plate 14.—The Gippsland Perch (Lates colonorum, Günth.).
Plate 15.—The Murray Lobster (Astacoides serratus, Shaw sp.).
Plate 16.—The Salmon Arripis (Arripis truttaceus, Cuv. sp.). Adult.
Plate 17.—Ditto of the younger forms and coloring.
Plate 18.—The Horse Mackerel (Trachurus trachurus, Lin. sp.).
Plate 19.—The Small-scaled Rock Cod (Lotella callarias, Günth.).
Plate 20.—The Australian Rock Cod (Pseudophysis barbatus, Günth.).

DECADE III.

Plate 21.—The Sea-Leopard Seal (Stenorhynchus leptonyx, de Blainv. sp.).
Plate 22.—The Yellow-sided Dolphin (Delphinus Novæ Zealandiæ, Quoy and Gaim.).
Plate 23.—The Common Brown Snake (Diemenia superciliosa, Fisch.).
    The Small-scaled Brown Snake (Diemenia microlepidota, McCoy).
    The Shield-fronted Brown Snake (Diemenia aspidorhyncha, McCoy).
Plate 24.—Catenicella margaritacea (Busk).—C. plagiostoma (Busk) —C. ventricosa (Busk).—C. hastata (Busk.)—C. rufa (McG.).—C. cribraria (Busk).—C. alata (Wyv. Thomson).—C. lorica (Busk).—C. formosa (Busk).—C. elegans (Busk).—C. perforata (Busk).—C. Buskii (Wyv. Thomson).—C. Hannafordi (McG.).—C. crystallina (Wyv. Thomson).—C. carinata (Busk).—C. aurita (Busk).—C. geminata (Wyv. Thomson).—C. cornuta (Busk).—C. intermedia (McG.)
Plate 25.—Membranipora membranacea (Linn. sp.).—M. perforata (McG.).—M. ciliata (McG.).—M. mamillaris (McG.).—M. umbonata (Busk).—M. pilosa (Linn. sp.).—M. cervicornis (Busk).
Plate 26.—Membranipora dispar (McG.).—M. Woodsii (McG.).—M. lineata (Linn. sp.).—M. Rosselii (Audouin sp.).—M. Lacroixii (Savigny sp.).
Plate 27.—The Australian Rockling (Genypterus Australis, Cast.).
    The Yarra Blackfish (Gadopsis gracilis, McCoy).
Plate 28.—The Southern Mackerel (Scomber pneumatophorus, De la Roche).
Plate 29.—The Yabber Crayfish (Astacoides bicarinatus, Gray sp.).
Plate 30.—The Large Wattle Goat-Moth (Zeuzera Eucalypti, Boisd. Herr.-Schæf.).

CONTENTS OF DECADES.

DECADE IV.

Plate 31.—The Australian Sea-Bear or Fur-Seal (Euotaria cinerea, Péron sp.).
Plate 32.—The Two-hooded Furina-Snake, Furina bicucullata (McCoy).
Plate 33.—The Banded Red Gurnet-Perch (Sebastes percoides, Solander sp.).
Plate 34.—The Angel-fish (Rhina squatina, Lin. sp.).
Plate 35.—Lepralia circinata (McG.).—L. Cecilii (Aud.).—L. diaphana (McG.).—L. marsupium (McG.).—L. subimmersa (McG.).—L. anceps (McG.).—L. Maplestonei (McG.).
Plate 36.—Lepralia vittata (McG.). — Membranipora perforata. Lepralia Brogniartii (Aud.). — L. elegans (McG.).—L. pertusa (Esper. sp.).—L. Malusii (Aud. sp.).—L. lunata (McG.).
Plate 37.—Lepralia ciliata (Linn. sp.).—L. trifolium (McG.).—L. cheilodon (McG.).—L. canaliculata (McG.).—L. larvalis (McG.).—L. diadema (McG.).—L. papillifera (McG.).—L. Ellerii (McG.).
Plate 38.—Lepralia monoceros (Busk). — L. excavata (McG.). — L. vitrea (McG.). — L. megasoma (McG.).—L. Schizostoma (McG.).—L. Botryoides (McG.).—L. ferox (McG.).—L. pellucida (McG.).
Plate 39.—Crisia Edwardsiana (D'Orb. sp.).—C. biciliata (McG.).—C. acropora (Busk).—C. setosa (McG.).—C. tenuis (McG.).
Plate 40.—Saunders' Case-Moth (Metura elongata, Saunders sp.).
The Lictor Case-Moth (Entometa ignobilis, Walk.).

DECADE V.

Plate 41.—The Lace Lizard (Hydrosaurus varius, Shaw sp.).
Plate 42.—The Spotted Marsh-Frog (Limnodynastes Tasmaniensis, Günth.). — The Common Sand-Frog (Limnodynastes dorsalis, Gray).
Plate 43.—The Carpet Shark (Crossorhinus barbatus, Lin. sp.).—The Seven-gilled Shark (Notidanus [Heptanchus] Indicus, Cuv.).
Plate 44.—The Barracouta (Thersites atun, Cuv.).—The Tunny (Thynnus Thynnus, Lin. sp.).
Plate 45.—Flustra denticulata (Busk). — Carbasea episcopalis (Busk). — C. dissimilis (Busk). — C. indivisa (Busk).—C. elegans (Busk).—C. pisciformis (Busk).
Plate 46.—Spiralaria florea (Busk).—Diachoris Magellanica (Busk).—D. spinigera (P. McGil.).—Dimetopia spicata (Busk).—D. cornuta (Busk).—Didymia simplex (Busk).—Calwellia bicornis (Wyv. Thomson).
Plate 47.—Dictyopora cellulosa (P. McGil.).
Plate 48.—Eschara obliqua (P. McGil.).—E. dispar (P. McGil).—E. gracilis (Lamx.).—E. platalea (Busk).—E. quadrata (P. McGil.)—E. mucronata (P. McGil.).—Caleschara denticulata (P. McGil.).
Plate 49.—Cellaria fistulosa (Linn.).—C. hirsuta (P. McGil.).—C. tenuirostris (Busk.).—C. gracilis (Busk).—Nellia oculata (Busk).—Tubucellaria hirsuta (Busk).
Plate 50.—The Great Black, or Manna Cicada (Cicada mœrens, Germ.).—The Great Green Cicada (Cyclochila Australasiæ, Donov. sp.).

DECADE VI.

Plate 51.—The Victorian Rhodona (Rhodona Officeri, McCoy).
Plate 52.—The Black and White Ringed Snake (Vermicella annulata, Gray).
Plate 53.—The Green and Golden Bell-Frog (Ranoidea aurea, Less. sp.).
Plates 54–55.—The Australian Aulopus (Aulopus purpurisatus, Rich.).
Plate 56.—The Hammer-headed Shark (Zygæna malleus, Shaw).—The Common Australian Saw-Fish (Pristiophorus nudipinnis, Günth.).
Plate 57.—Biflustra perfragilis (McGil.).—B. delicatula (Busk).
Plate 58.—Cellularia cuspidata (Busk).—Menipea crystallina (Gray sp.).—M. cyathus (Wyv. Thomson).—M. cervicornis (McGil.)—M. tricellata (Busk).—M. Buskii (Wyv. Thomson).
Plate 59.—Bicellaria tuba (Busk).—B. grandis (Busk).—B. ciliata (Linn).—B. turbinata (McGil.).—Stirparia annulata (Map.).—Bugula neritina (Linn.).
Plate 60.—Steganoporella magnilabris (Busk. sp.).—Petralia undata (McGil.).

CONTENTS OF DECADES.

DECADE VII.

Plate 61.—The Tuberculated Argonaut (Argonauta oryzata, Meusch.).
Plate 62.—The same seated in its so-called shell or Paper-Nautilus.
Plate 63.—The Blue-spotted Eagle-Ray (Myliobatis Australis, Macleay).
Plate 64.—The Long-toothed Bull-Shark (Odontaspis taurus, Raf.).—The Australian Tope Shark (Galeus Australis, Macleay).
Plate 65.—The Leafy Sea-Dragon (Phyllopteryx foliatus, Shaw sp.).—The Short-headed Sea-horse (Hippocampus breviceps, Pet.)
Plate 66.—Dictyopora grisea (Lamx. sp.).—D. albida (Kirch.)—(Var. avicularis, P. McGill.).
Plate 67.—D. Wilsoni (P. McGill.).
Plate 68.—Idmonea Milneana (d'Orb.).—I. contorta (P. McGill.).—I. radians (Lamk.).
Plates 69–70.—The Violet-shouldered Phasma (Tropidoderus iodomus, McCoy).—The Red-shouldered Phasma (Tropidoderus rhodomus, McCoy).

CONTENTS OF DECADE VIII.

N.B.—The originals of all the Figures are in the National Museum, Melbourne.

PLATE 71.—The Australian Sea-Bear or Fur-Seal (Euotaria cinerea, Péron sp.).

PLATE 72.—The Northern Blue-tongued Lizard (Cyclodus gigas, Bodd. sp.).

PLATE 73.—The Ludrick (Girella simplex, Rich. sp.).

PLATE 74.—The White Shark (Carcharodon Rondeletii, Müll. and Hen.).

PLATE 75.—The Picked Dog-Fish (Acanthias vulgaris, Linn. sp.).

PLATES 76–77.—The Australian Tooth-cupped Cuttlefish (Sepioteuthis Australis, Quoy and Gaim.).

PLATE 78.—Bugula robusta (P. McGil.).—B. cucullata (Busk).—B. dentata (Lamx.).—B. avicularia (Pall.).

PLATE 79.—The Violet-winged Phasma (Acrophylla violascens, Leach sp.).

PLATE 80.—The Large Pink winged Phasma (Podacanthus typhon, Gray).

MARY D. ROGICK

Natural History of Victoria.

PRODROMUS

OF THE

ZOOLOGY OF VICTORIA;

OR,

FIGURES AND DESCRIPTIONS OF THE LIVING SPECIES OF ALL CLASSES

OF THE

VICTORIAN INDIGENOUS ANIMALS.

DECADE IX.

BY

FREDERICK McCOY, F.R.S.,

HONORARY MEMBER OF THE CAMBRIDGE PHILOSOPHICAL SOCIETY; HONORARY ACTIVE MEMBER OF THE IMPERIAL SOCIETY OF NATURALISTS OF MOSCOW; CORRESPONDING MEMBER OF THE ZOOLOGICAL SOCIETY OF LONDON; HONORARY MEMBER OF THE ROYAL SOCIETY OF NEW SOUTH WALES; HONORARY FELLOW OF THE GEOLOGICAL SOCIETY OF EDINBURGH; HONORARY MEMBER OF THE GEOLOGICAL SOCIETY OF MANCHESTER,
ETC., ETC., ETC.
AUTHOR OF "SYNOPSIS OF THE CARBONIFEROUS LIMESTONE FOSSILS OF IRELAND;" "SYNOPSIS OF THE SILURIAN FOSSILS OF IRELAND;" "CONTRIBUTIONS TO BRITISH PALÆONTOLOGY;" ONE OF THE AUTHORS OF SEDGWICK AND McCOY'S "BRITISH PALÆOZOIC ROCKS AND FOSSILS;" "PRODROMUS OF THE PALÆONTOLOGY OF VICTORIA," ETC.
PROFESSOR OF NATURAL SCIENCE IN THE MELBOURNE UNIVERSITY.
GOVERNMENT PALÆONTOLOGIST, AND DIRECTOR OF THE NATIONAL MUSEUM OF MELBOURNE, ETC.

MELBOURNE:
BY AUTHORITY: JOHN FERRES, GOVERNMENT PRINTER.
PUBLISHED BY GEORGE ROBERTSON, LITTLE COLLINS STREET.
LONDON: TRÜBNER AND CO., 57 AND 59 LUDGATE HILL; AND GEORGE ROBERTSON,
17 WARWICK SQUARE.

M DCCC LXXXIV.

Natural History of Victoria.

PRODROMUS

OF THE

ZOOLOGY OF VICTORIA;

OR,

FIGURES AND DESCRIPTIONS OF THE LIVING SPECIES OF ALL CLASSES

OF THE

VICTORIAN INDIGENOUS ANIMALS.

DECADE IX.

BY
FREDERICK McCOY, F.R.S.,
HONORARY MEMBER OF THE CAMBRIDGE PHILOSOPHICAL SOCIETY; HONORARY ACTIVE MEMBER OF THE IMPERIAL SOCIETY OF NATURALISTS OF MOSCOW; CORRESPONDING MEMBER OF THE ZOOLOGICAL SOCIETY OF LONDON;
HONORARY MEMBER OF THE ROYAL SOCIETY OF NEW SOUTH WALES; HONORARY FELLOW OF THE GEOLOGICAL SOCIETY OF EDINBURGH; HONORARY MEMBER OF THE GEOLOGICAL SOCIETY OF MANCHESTER,
ETC., ETC., ETC.
AUTHOR OF "SYNOPSIS OF THE CARBONIFEROUS LIMESTONE FOSSILS OF IRELAND;" "SYNOPSIS OF THE SILURIAN FOSSILS OF IRELAND;" "CONTRIBUTIONS TO BRITISH PALÆONTOLOGY;" ONE OF THE AUTHORS OF SEDGWICK AND McCOY'S "BRITISH PALÆOZOIC ROCKS AND FOSSILS;" "PRODROMUS OF THE PALÆONTOLOGY OF VICTORIA," ETC.
PROFESSOR OF NATURAL SCIENCE IN THE MELBOURNE UNIVERSITY.
GOVERNMENT PALÆONTOLOGIST, AND DIRECTOR OF THE NATIONAL MUSEUM OF MELBOURNE, ETC.

MELBOURNE:
BY AUTHORITY: JOHN FERRES, GOVERNMENT PRINTER.
PUBLISHED BY GEORGE ROBERTSON, LITTLE COLLINS STREET.
LONDON: TRÜBNER AND CO., 57 AND 59 LUDGATE HILL; AND GEORGE ROBERTSON,
17 WARWICK SQUARE.

M DCCC LXXXIV

PREFACE.

It having been considered desirable to ascertain accurately the natural productions of the Colony of Victoria, and to publish works descriptive of them, on the plan of those issued by the Governments of the different States of America, investigations were undertaken, by order of the Victorian Government, to determine the Geology, Botany, and Zoology of the Colony, to form collections illustrative of each for the public use, and to make the necessary preparations for such systematic publications on the subject as might be useful and interesting to the general public, and contribute to the advancement of science.

As the geological and botanical investigations have already approached completion, and their publication is far advanced, it has been decided to now commence the publication of the third branch completing the subject, namely, that of the Zoology or indigenous members of the different classes of the animal kingdom.

As the Fauna is not so well known as the Flora, it was a necessary preliminary to the publication to have a large number of drawings made, as opportunity arose, from the living or fresh examples of many species of reptiles, fish, and the lower animals, which lose their natural appearance shortly after death, and the true characters of many of which were consequently as yet unknown, as they had

only been described from preserved specimens. A Prodromus, or preliminary issue, in the form of Decades, or numbers of ten plates, each with its complete descriptive letterpress, will be published, of such illustrations as are ready, without systematic order or waiting for the completion of any one branch. The many good observers in the country will thus have the means of accurately identifying various natural objects, their observations on which, if recorded and sent to the National Museum, where the originals of all the figures and descriptions are preserved, will be duly acknowledged, and will materially help in the preparation of the final systematic volume to be published for each class when it approaches completion.

This ninth Decade gives figures and descriptions in the first plate of an interesting Lizard, a variety of the *Physignathus Lesueri*, from the Gippsland Rivers, for specimens of which I am indebted to that indefatigable man of science, Mr. Warden Howitt. It is this rarely-seen creature which has given rise to the rumor that Crocodiles inhabited the almost inaccessible rivers in which it is found.

The second and third plates figure one of our River Tortoises, generally called the Murray Turtle.

The fourth plate shows the beautiful Murray Golden Perch of its natural colors for the first time.

The fifth and sixth plates give the chief varieties and details of natural coloring for the first time of our famous Murray Cod-Perch.

The seventh plate gives the colored representation for the first time of our commonest Dog-fish, the Australian Smooth-Hound.

The eighth plate represents the strange form of the Thresher, or Long-tailed, or Fox, Shark, obviously identical with the European examples, and one of rare occurrence amongst the Sharks of our seas.

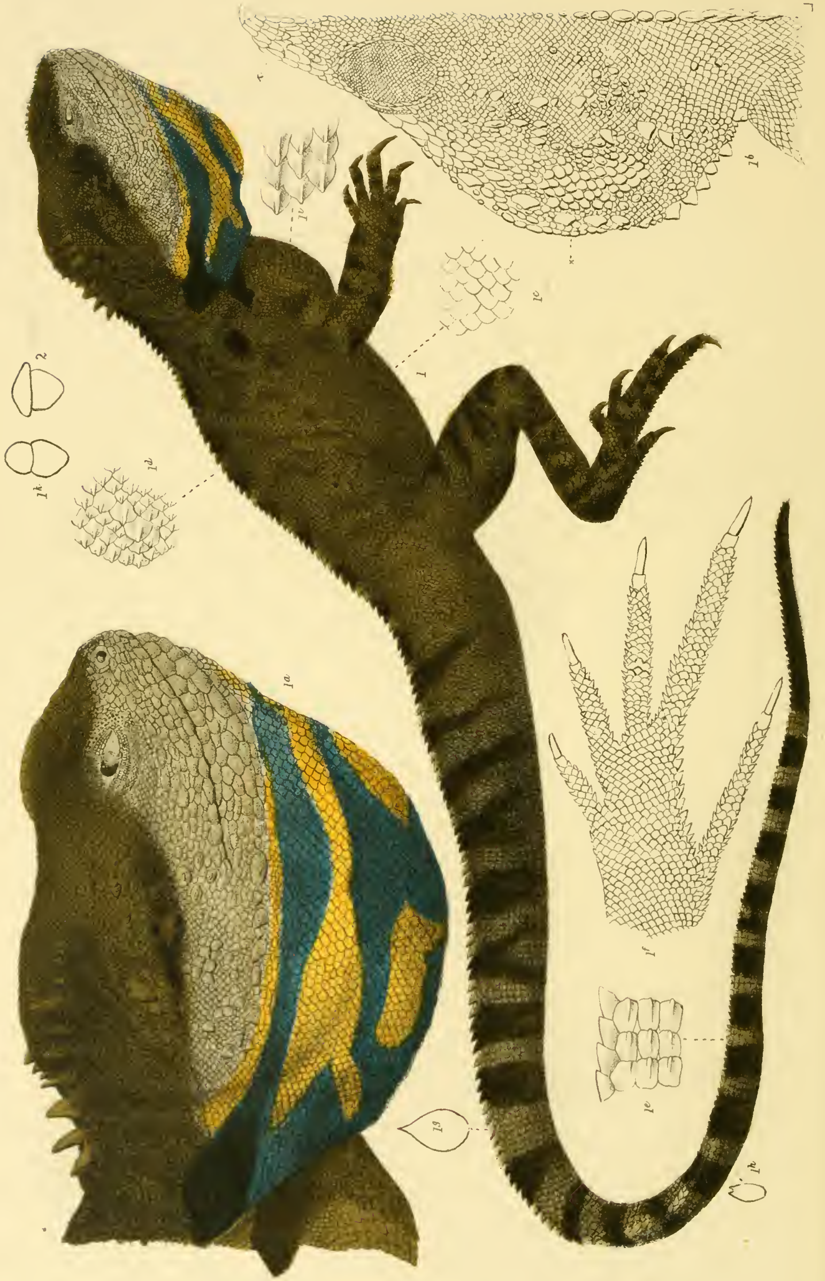
PREFACE.

The two following plates continue the illustrations of our Polyzoa contributed by Dr. MacGillivray to the National Museum and this work.

The succeeding Decades will illustrate as many different genera as possible, and will deal first usually with species of some special interest, and of which good figures do not exist, or are not easily accessible.

FREDERICK McCOY.

11th December 1882.



A Bartholomew del et lith
Prof. McCoy direx.
Steam lith. Govt Printing Office

PLATE 81.

PHYSIGNATHUS LESUERI (GRAY),

VAR. HOWITTI (MCCOY).

THE GIPPSLAND WATER LIZARD.

[Genus PHYSIGNATHUS (CUVIER). (Sub-kingd. Vertebrata. Class Reptilia. Order Sauria. Sub-order Pachyglossæ. Tribe Strobilosaura. Family Agamidæ.)

Gen. Char.—Head pyramidal, quadrangular, greatly swollen at the parotid sides of the angle of the jaws; covered with very small, subequal, polygonal, keeled plates; rostral angle raised into a superciliary ridge; nostrils lateral, near tip of snout; ear-drum large, on a level with the surface. Four incisors and six longer, arched, pointed, laniary teeth on each side in upper jaw, with thirteen shorter, triangular molars. Tongue wide, thick, spongy, slightly narrow and notched at tip; skin of throat extended to form a small dew-lap; a V-shaped transverse fold between the neck and the chest. Neck, body, and tail compressed and with a crest of erect, compressed scales as far as middle of tail, which is two-thirds of the total length. Scales of the body rhomboidal, scarcely imbricated, in transverse rows, of very unequal sizes. Toes widened by a border of broad scales on each side, projecting horizontally. Femoral pores distinct.]

DESCRIPTION.—Form elongate, tapering; neck and body moderately compressed, angular along the back; tail very much compressed; serrated crest of moderately arched, triangular scales along mid-line of back from nape to near middle of tail, beyond which there are two smaller parallel crests with a narrow hollow between them to the tip; head with small, polygonal, elongate, obtusely keeled or angulated plates on top, those near tip of snout a little larger than those behind; an ovate space over each eye, bounded internally by an arched line of erect scales, larger than the others of the head, is covered by minute hexagonal scales about half the size of those on the middle of the top of the head; a nearly vertical arched ridge of strong scales over each eye at angle of head; eyelids covered with very small plates; each lip with 12 large marginal, flat, smooth plates; a few rows of large smooth scales extending from the chin nearly to the ear; chin plate pentagonal or nearly triangular; rostral plate hexagonal, about twice as wide as high; an irregular row of large conical tubercular plates on side of cheek, and about 9 vertical irregular rows extending from the dorsal crest nearly to the belly, each about as wide as 3 of the adjacent plates; occiput with numerous small conical polygonal tubercles, and one small flat oval occipital plate. Ear large, round. Tail strong at base, strongly compressed and tapering to a very slender posterior extremity, the single dorsal crest extending to rather less than half of its length, after which the crest is doubled. Scales under the chin smooth, convex, rhomboidal; those on the pouch and under the neck strongly keeled, the keel ending in a point directed backwards; ventral scales quadrate, with a slight keel, obsolete on many of them; over the neck small conical tubercles with compressed summit; scales on sides of neck keeled, rhomboidal, with posterior angle forming a straight spine; scales of sides of body and upper part of tail in vertical bands of little quadrate tubercles, each with a keel, most prominent at the posterior angle; not imbricated; amongst these the irregular vertical rows of three-sided spinous tubercles with wide rounded base; scales of legs strongly keeled, except on under-side of thighs and legs, where they are smooth, large on front of thighs, small behind, moderate elsewhere; a few much larger, rhomboidal, more strongly keeled plates among the others; scales of sides of tail in vertical bands, and so strongly keeled as to form conspicuous longitudinal ridges. *Color:*—Entire upper surface and sides of head, body, and toes dark-olive (sometimes with a brownish upper skin, below which the dark color is seen), with a row of 20 large rounded jet-black spots along the dorsal crest, those of tail extending downwards as dark-olive bands separated by narrow, much lighter bands; a dark band from eye to ear, which it encloses with a jet-black patch, another round black spot over the shoulder; pouch irregularly marked with broad longitudinal bands of dark indigo-blue and the richest cadmium yellow; breast and belly blackish in figured specimen, but dirty yellow with occasional small black flecks in other individuals; sides of head light-olive; a few irregular black spots on head and back and sides.

MEASUREMENTS.

	QUEENSLAND SPECIMEN.			GIPPSLAND SPECIMEN.			GIPPSLAND SPECIMEN.		
	Ft.	ins.	lines.	Ft.	ins.	lines.	Ft.	ins.	lines.
Length from snout to end of tail	3	1	0	2	5	0	2	5	6
„ „ nostril	0	0	4	0	0	4	0	0	4
„ „ anterior edge of orbit	0	1	0	0	0	11	0	0	11
„ „ „ „ ear	0	2	3	0	2	1	0	2	0
Diameter of ear-drum	0	0	3	0	0	3	0	0	3
Length from snout to anterior limb	0	4	9	0	4	0	0	3	10
„ „ posterior limb	0	10	0	0	8	0	0	8	2
Length of body	0	11	0	0	9	0	0	9	3
„ tail	2	2	0	1	8	0	1	9	3
„ head	0	2	9	0	3	0	0	2	10
Width across superciliary ridges	0	1	0	0	1	2	0	1	2
Length of anterior limb from shoulder to end of longest toe	0	4	9	0	3	5	0	3	9
„ posterior limb to end of longest toe	0	8	3	0	6	9	0	6	10
„ free portion of inner anterior toe and claw	0	0	8	0	0	6	0	0	6½
„ „ second „ „	0	0	11	0	0	10	0	0	10
„ „ third „ „	0	1	3	0	1	1	0	1	0
„ „ fourth „ „	0	1	4	0	1	1½	0	1	0
„ „ outer „ „	0	0	11	0	0	9	0	0	9
„ anterior toe and claw of hind foot	0	1	3	0	0	6	0	0	6
„ second „ „	0	1	2	0	0	10	0	0	11
„ third „ „	0	1	7	0	1	4	0	1	3
„ fourth „ „	0	2	0	0	2	4	0	1	8
„ posterior toe and claw of hind foot	0	1	4	0	1	2	0	1	2
Greatest depth of body	0	2	9	0	2	2	0	2	0
„ width „	0	2	6	0	2	3	0	2	3
Depth of base of tail	0	1	6	0	1	3	0	1	5
Width „	0	1	4	0	1	1	0	1	2
Depth at middle of tail	0	0	8	0	0	8	0	0	9
Width „	0	0	6	0	0	5	0	0	4
Depth at end of tail	0	0	1½	0	0	1½	0	0	1½
Width „	0	0	1	0	0	1	0	0	1
Height of highest scales of dorsal crest on nape	0	0	3	0	0	3	0	0	3
„ „ at base of tail	0	0	3	0	0	2	0	0	1½
„ „ at middle of tail	0	0	2½	0	0	2	0	0	2
where doubled	0	0	1	0	0	1	0	0	0½

MEASUREMENTS—*continued.*

	QUEENSLAND SPECIMEN. Ft. ins. lines.	GIPPSLAND SPECIMEN. Ft. in. lines.	GIPPSLAND SPECIMEN. Ft.ins.lines.
Diameter of large spinose scales on sides of body	0 0 1½	0 0 1½	0 0 1
Number of rows of scales in 3 lines at middle of body	Five	Five	Six
Number of scales in 3 lines at anterior part of top of the head lengthwise	Five	Three to four	Three & a half
„ „ in the supraorbital patches	Ten lengthwise, fourteen across	Six lengthwise, ten across	Seven lengthwise, ten across
„ „ between supraorbital patches	Eight lengthwise, eleven across	Four lengthwise, eight across	Five lengthwise, eight across
„ „ in middle of belly	Three	Five	Five
Length of chin plate	0 0 3	0 0 3	0 0 2½
Width of same at upper base	0 0 3	0 0 3	0 0 3
Height of rostral plate	0 0 1⅓	0 0 2	0 0 2
*Width of same	0 0 4	0 0 3½	0 0 3½

REFERENCE.—*Lophura Lesueri* (Gray), Syn. Rept. in Griffith ed. of Cuv. Anim. Kingd. v. 9, p. 60 = *Istiurus* id. (Duméril and Bibron), Erpt. Gén. v. 4, p. 384, t. 40 = *Physignathus* id. (Gray), Cat. Liz. B. M. = *Amphibolurus heterurus* (Peters), Monatsberichte der Königlich Preuss. Akad. der Wissenschaften zu Berlin 1866, p. 86.

The bladder-like inflation of the hinder part of the head near the hind angle of the jaws, from which the genus derives its name, is very striking in these aquatic Lizards, which inhabit rivers, in which they swim well, from the wide expansion or horizontal fringe of scales on the sides of the long stout toes.

The larger conoidal scales form irregular rows on the sides of the head and vertically across the sides of the body and base of tail, amongst the greatly more numerous ordinary small ones.

The only difference I observe between this and the typical *P. Lesueri* of Queensland is the greater width in proportion to the height of the rostral plate in the Queensland one ; and the superocular group of scales being about one-half the size of the others on the anterior part of the top of the head, instead of being only ⅓ or ¼ the size, as Peters states ;† and as it is improbable that such creatures would have so great a geographical range as to be common to Gippsland and Queensland, with such an enormous space between the rivers, I name the variety or probable species after that excellent geologist, magistrate, and bushman, my accomplished friend Mr. A. Howitt, who, with his multifarious and laborious duties, in so difficult a country to traverse, is always ready and willing to aid in any scientific investigation of the natural products of Gippsland, and who with infinite difficulty succeeded in procuring three specimens for me of this River-Lizard. The proverb that "Cows far off have long horns" is ludicrously exemplified in the case of this Lizard, which has apparently given rise to the rumors of Crocodiles having been seen in Gippsland ; a country so rugged and overgrown with forests and almost impenetrable scrub that it is an extremely rare occurrence for a white man to reach the habitat in which the *Physignathus* is found, in the upper reaches of the Buchan River.

---

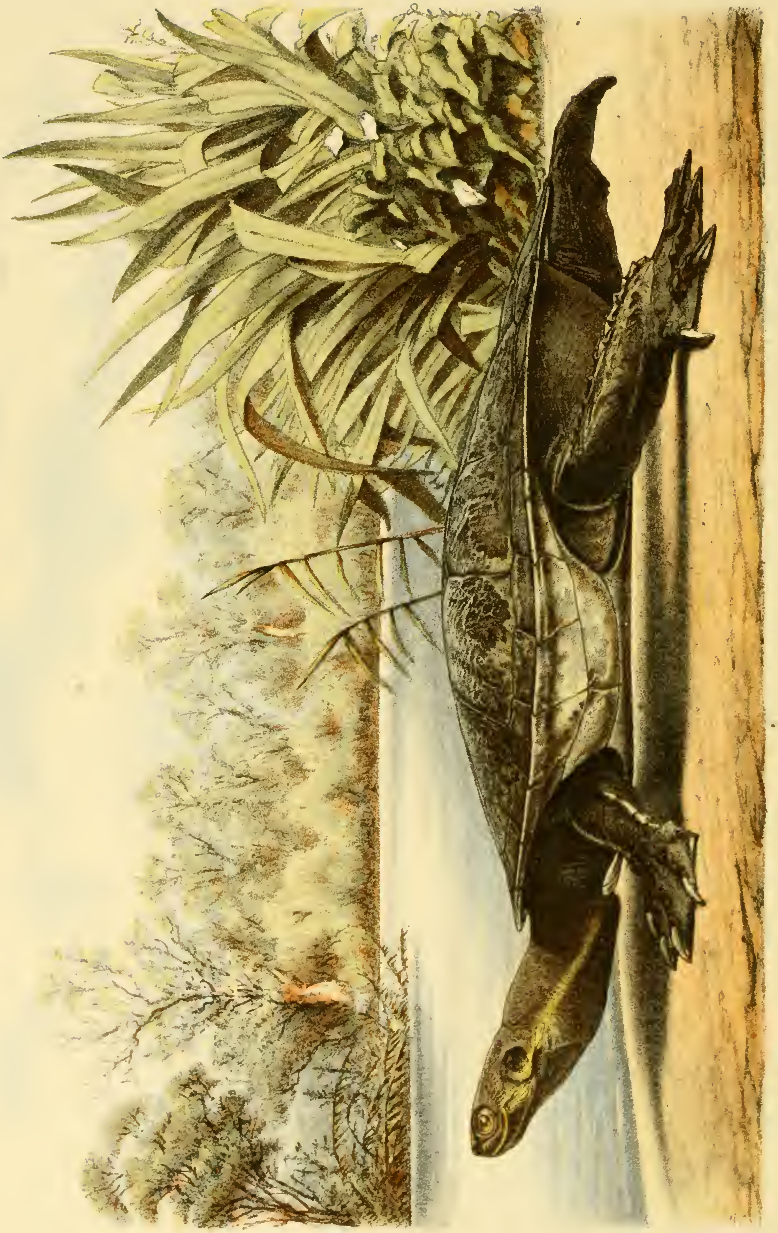
* These measurements are, in each of the three specimens, taken across, the points of the compass touching each lateral suture; if measured in two halves from centre to each lateral suture along the curved surface, the Queensland one measures five lines and the two Victorian four lines each.

† "Die Supraorbitalschuppen sind auffallend klein, 3 bis 4 Mal kleiner als die Schuppen des Vorderkopfes."

EXPLANATION OF FIGURES.

PLATE 81.—Fig. 1, side view, one-half natural size. Fig. 1*a*, side view of head, natural size. Fig. 1*b*, top view of head, natural size (the scales of the supraorbital patches too small). Fig. 1*c*, scales of belly, twice natural size. Fig. 1*d*, scales of sides of body, magnified twice. Fig. 1*e*, scales of side of tail, magnified two diameters. Fig. 1*f*, hind foot, natural size, to show projecting scales of edge of toes. Fig. 1*g*, section of tail before doubling of dorsal crest. Fig. 1*h*, section of tail after doubling of dorsal crest. Fig. 1*i*, scales of throat, magnified two diameters. Fig. 1*k*, rostral and chin plates, natural size. Fig. 2, rostral and chin plates of Queensland specimen to show the difference of proportion of the rostral.

FREDERICK McCOY.

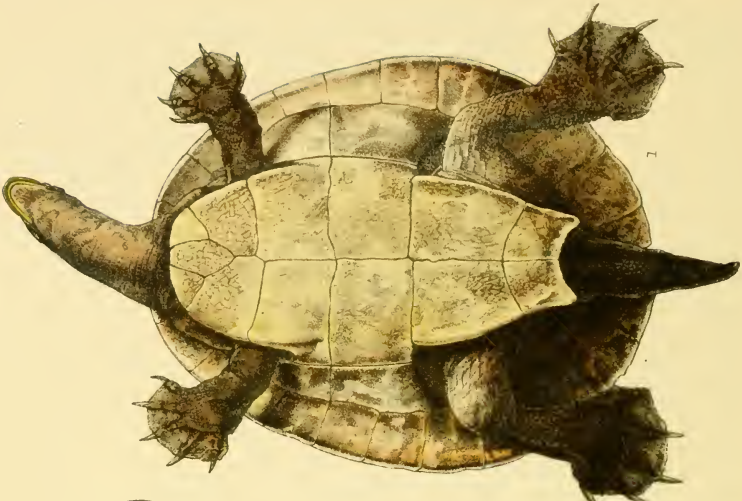


[illegible] Wild del. et lith. Prof. M'Coy direx. Steam lith. Govt. Printing Office

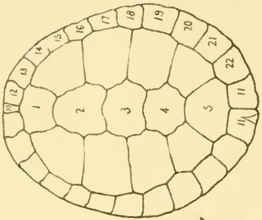
Pl 83

ZOOLOGY OF VICTORIA

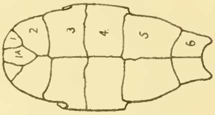
(Reptiles)



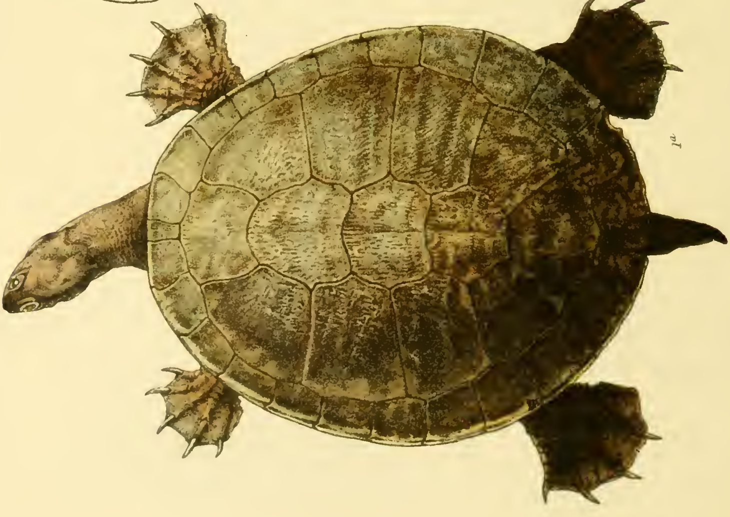
1



2



3



1a

[illegible] Wild del et lith

Prof Mc Coy dirext

Steam litho Govt Printing Office

PLATES 82 AND 83.

CHELYMYS MACQUARIA (CUV. SP.).

THE MURRAY TORTOISE.

[Genus CHELYMYS (GRAY). (Sub-kingd. Vertebrata. Class Reptilia. Section Cataphracta. Order Chelonia. Sub-ord. Pleuroderes. Fam. Chelydidæ. Sub-fam. Hydraspidinæ.)
Gen. Char.—Carapace moderately convex, solid, ovate, wide behind, side edges slightly turned up; nuchal shield distinct; internal cavity contracted in front to half the width of the outer opening by two internal diverging septa; vertebræ sharply keeled within; sternum solid, narrow, anterior and posterior ends bent slightly upwards, with broad sides reflected upwards at an obtuse angle, and a wide angular notch behind between the anal plates; intergular plate marginal. Head moderate, flat, covered by a thin, smooth skin, reticulated so as to form small irregular plates on the temples; no zygomatic arch; ear-drum large, round; jaws naked, horny, strong; neck long, with a granular skin; two small conical barbels under the chin. Feet with wide web between the toes; claws long, acute, five on the anterior feet, four on the posterior feet, the hind posterior toe having no claw. Australia.]

DESCRIPTION.—Shell ovate, moderately convex, with a slight longitudinal, very narrow sulcus along the middle of the 2nd, 3rd, and 4th vertebral shields,* interrupted at their edges; 1st vertebral plate equal to the 5th, but shorter than the others, large, four-sided, narrowed and concave behind, touching the nuchal, first marginal, and half of second marginal plates, in front, outer sides slightly convex; 2nd, 3rd and 4th obscurely hexagonal, with waving lateral margins, the 2nd plate longest; 5th plate widest behind, where it touches the caudal and half the last lateral plate on each side; nuchal plate narrow, oblong, one-third longer than wide; all the other marginal plates gradually widening towards the posterior end from the 4th, which is smallest, very slightly inclined upwards, forming a shallow concavity outside the convexity of the sides of the carapace behind the anterior limbs to the caudal plates, which are nearly on a level with the nuchal one, all the intervening lateral plates being a little below their level; the five posterior ones with a slight notch in the middle of each, and sometimes at the suture along the edge. Vertebral, costal, and marginal plates rugged, with narrow, irregularly reticulating, vermiform, impressed grooves, chiefly longitudinal in direction. Plastron or sternum narrow, semi-oval, and wider in front than behind, the sides sloping upwards at an obtuse angle; gular plates triangular, smaller than the intergular plate which separates them on the margin. Reticulation of the skin forming polygonal plate-like spaces on the temples; top of the head covered with thin smooth skin; jaws naked; skin of anterior legs with the granules between the reticulations of the skin larger and more plate-like than on the neck. A row of long, arched, narrow, transverse scales on the anterior edge of the leg, and a row of seven or eight not transversely elongated on the posterior edge. Posterior limb with more regularly-plated granulation than the anterior, with a distinct row of 6 or 8 large transversely enlongated plates on the posterior margin. *Color:*—The whole of the upper surface dark brownish-olive; whole of the under surface dull brownish and greenish yellow, irregularly netted with impressed grooves, but without dark margins or spots. Skin of neck moderately granular, reticulated, of a blackish-olive tint, a pale-yellow streak extending from the edges of the jaws across the lower edge of the ear a variable distance along each side of the neck.

---

* The diagrams on Plate 83, figures 2 and 3, identify the different shields and plates referred to.

MEASUREMENTS.

—	Largest Female, from Junct. M. & D.		More convex, from Goulburn.		Female, from Wahgunyah.		Smaller sp., Wahgunyah.		Wahgunyah.		Young, Wahgunyah.		Male, from junct. of Murray and Darling.	
	in.	lines	in.	lines	in.	lines	in.	lines	in.	lines	in.	lines	in.	lines
Length of carapace	11	3	10	0	9	6	8	10	7	6	5	1	9	6
Greatest width	9	0	7	9	7	8	7	4	6	6	4	4	7	0
Depth from middle of sternum to middle of carapace	3	9	3	4	4	0	3	0	2	6	1	6	3	3
Length of nuchal plate	0	9	0	8	0	7	0	7	0	8	0	6	0	9
Width „ „	0	6	0	5	0	4	0	3	0	3	0	2	0	3½
Outer margin of 1st lateral plate	1	0	0	11	0	11	0	9	0	9	0	5	1	0
„ 2nd „	1	3	1	1	1	1	0	10	0	11	0	6	1	0
„ 3rd „	1	3	1	1	0	11	0	11	0	9	0	5½	1	0
„ 4th „	1	4	1	1	1	2	1	0	0	9	0	6	1	0
„ 5th „	1	3	1	1	1	1	1	0	0	9	0	6	1	1
„ 6th „	1	3	1	1	1	2	1	1	0	10	0	6	1	1
„ 7th „	1	5	1	2	1	3	1	3	0	11	0	7	1	2
„ 8th „	1	5	1	2	1	3	1	3	1	0	0	7½	1	2
„ 9th „	1	6	1	3	1	3	1	3	1	0	0	9	1	2
„ 10th „	1	5	1	3	1	2	1	1	1	0	0	9	1	1
„ 11th „	1	4	1	2	1	0	1	1	0	10	0	9	1	1
„ caudal plates	1	3	1	2	1	0	1	1	0	11	0	8	1	2
Length of 1st vertebral plate	1	9	1	7	1	8	1	3	1	1	0	8	1	5
Greatest width at front	2	9	2	4	2	1	1	8	1	10	1	2	2	1
Width behind	1	8	1	5	1	3	1	1	1	1	0	9	1	4
Length of 2nd vertebral plate	2	5	2	0	2	0	1	8	1	5	0	11	1	11
Greatest width at middle	2	10	2	0	1	10	1	8	2	1	1	8	2	1
Length of 3rd vertebral plate	1	11	1	8	1	9	1	6	1	6	0	9	1	9
Greatest width	2	9	2	1	2	0	1	10	2	1	1	9	2	4
Length of 4th vertebral plate	2	0	1	10	1	8	1	6	1	3	0	10	1	6
Greatest width	2	7	1	11	1	9	1	11	1	10	1	7	2	0
Length of 5th vertebral plate	1	9	1	8	1	5	1	7	1	3	0	11	1	8
Greatest width behind	2	8	2	5	2	3	2	1	1	7	1	2	2	1
Width of front margin	1	1	0	8	0	9	0	9	0	9	0	7	0	9
Length of neck from front edge of carapace to occiput	2	9	1	6	1	8	1	6	1	6	1	4	2	1
Diameter at middle	1	5	1	4	1	4	1	2	1	1	0	7	1	2
Length of head	2	1	1	10	2	0	1	6	1	6	1	0	1	10
Greatest width at hind margin of ear	1	5	1	3	1	6	1	1	1	1	0	9	1	3
Greatest depth	1	2	1	2	1	2	1	0	0	10	0	7	1	0
Length of anterior limb	3	3	2	10	1	6	1	7	1	9	1	0	2	9
„ longest toe without claw	1	1	0	10	0	9	0	11	0	8	0	5	1	1
„ claw	0	7	0	5	0	5	0	3	0	4	0	3	0	4
„ posterior limb	4	7	3	2	2	5	2	10	2	6	1	7	3	5
„ longest toe without claw	1	6	1	3	1	5	1	1	0	11	0	8	1	4
„ claw	0	8	0	6	0	6	0	6	0	5	0	3	0	6
„ tail from posterior end of plastron	2	10	1	10	2	3	2	5	2	1	0	10	3	9
„ intergular plate	1	5	1	2	1	1	1	0	1	1	0	9	1	3
Greatest width „	1	1	0	10	0	7	0	9	0	6	0	4	0	8
Width at margin „	0	6	0	6	0	6½	0	6	0	3	0	2½	0	3½
Gular plates at outer margin	1	3	1	1	0	11	0	11	0	11	0	6	0	11
Outer margin of humeral plate	1	5	1	2	1	2	1	0	0	10	0	6	1	2
Length of anal plates at outer margin	1	4	1	2	1	0	1	1	1	0	0	8	1	0
Width of plastron across ends of caudal plates	2	1	1	10	1	4	1	5	1	2	0	9	1	7
„ „ „ posterior outer angles of gular plates	2	9	2	5	2	2	2	1	1	9	1	1	2	0

REFERENCE.—*Emys Macquaria*, (Cuv.), R. A., v. 2, p. 11 = *Hydraspis Australis*, (Gray), in Grey Jour. Exped. N.W. and W. Australia, v. 2, p. 445, t. 6 = *Platemys Macquaria*, (Dum. et Bib.), Erp. Gén., v. 2, p. 438.

Although popularly called the Murray Turtle by the colonists, the structure of the feet is that proper to the walking Tortoises, and not the exclusively swimming paddles of the true Turtles.

This species varies very much in the rugosity of the upper plates and in the depth of the shell ; some of the same age and sex being much smoother and flatter than others. The males usually are narrower and deeper or more convex, thicker and more rugose, than the females, and with larger tails. The young are more nearly orbicular, and with the notches in the posterior marginal plates very much deeper and more conspicuous than in the adults, and with, of course, the shields covering the shell very much thinner. The above series of measurements of specimens shows that the proportion of length to width of the vertebral plates also varies greatly in specimens otherwise perfectly alike, the 4th vertebral plate being sometimes as long as wide, and sometimes nearly twice as wide as long. The upper surface of the carapace is uniformly of a very dark-brownish or blackish-olive ; the marbling with grey which is mentioned by older writers only appearing in dried specimens ; the under-side of the sternum is always of a nearly uniform yellow-ochre tint, becoming of a more greenish or brownish hue towards the marginal plates, but without dark margins or spots ; the skin is uniform blackish, except the edges of the jaws and the streak from them along the sides of the neck and touching the lower edge of the ear-drum, which is yellow.

The size of the granules on the skin of the neck varies considerably also, irrespective of other characters. The so-called beards or barbels are two minute, soft, retractile, conical tubercles or papillæ, very likely to be overlooked, as when retracted they only leave a smooth oval spot. The presence or absence of this so-called beard cannot be taken as a character of generic value with advantage, as it varies so much, like the other appendages of the skin.

These Mud-Tortoises can scarcely be said to differ generically from the South American *Platemys* and *Hydraspis*, the two barbels under the chin being really present in all the specimens if carefully looked for, and the slightly more distinct plating of the temples with small polygonal shields constituting a very slight ground for generic distinction.

The eggs have a strong white calcareous shell, of a slightly ovate form, very little wider at one end than the other, bluntly rounded at each end ; about 1 in. 7 lines long and 1 in. 1 line in greatest diameter ; another specimen is 1 in. 8 lines long and 1 in. 1 line in diameter, being a little longer and proportionately narrower.

Very common in the River Murray and its branches, the Darling, Goulburn, &c., from which a great number of specimens of various ages and sizes are in the Museum. It is not found in the rivers flowing south into the sea on the Victorian coast. The specimen figured is one of average size from the Goulburn.

Although so common, no recognisable figure has been published before.

EXPLANATION OF FIGURES.

PLATE 82.—Side view, one-half natural size.

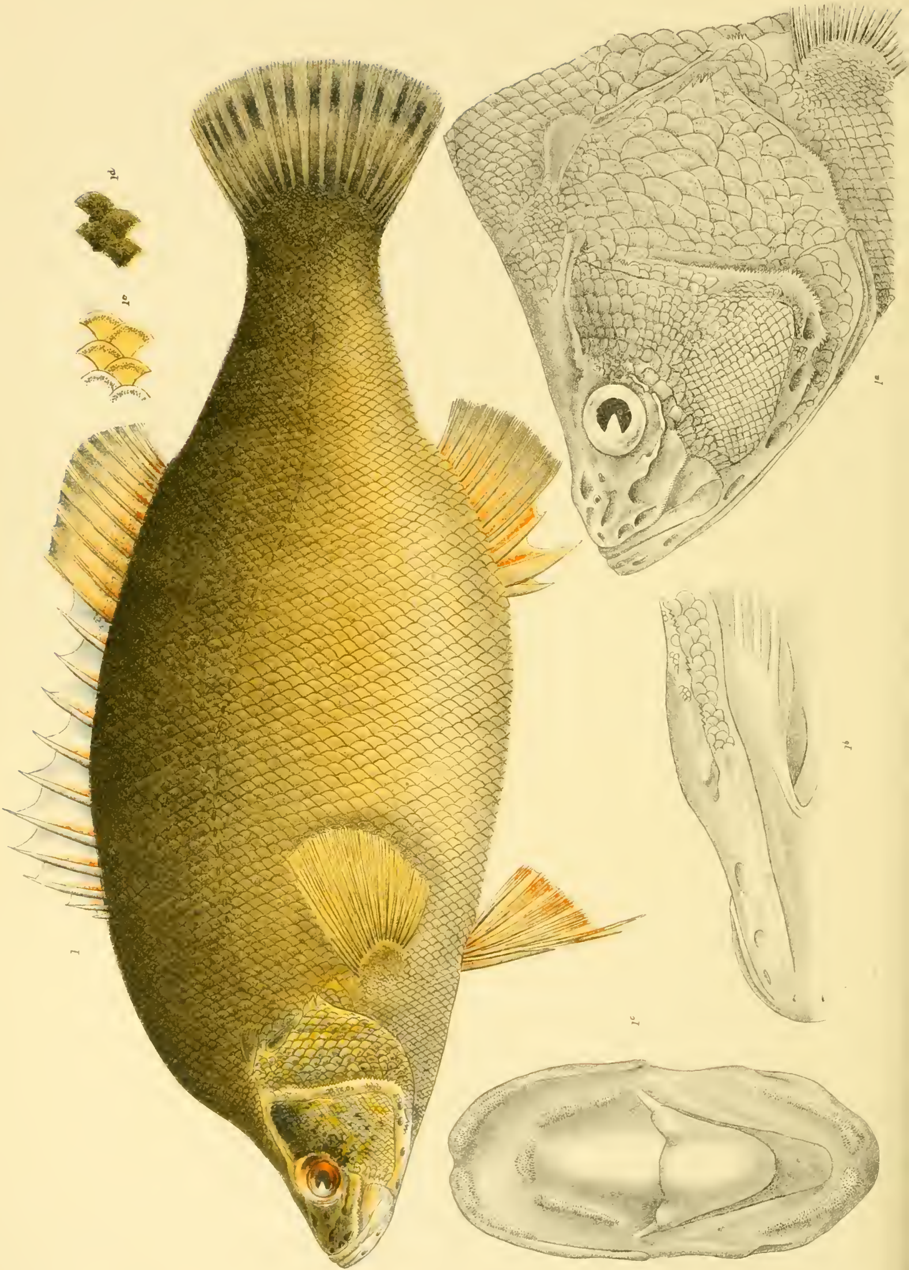
PLATE 83.—Fig. 1, ventral view, one-third natural size. Fig. 1*a*, same specimen, dorsal view. Fig. 2, diagram of plates of carapace; 1 to 5, vertebral plates; 10, nuchal plate ; 11, caudal plates ; 12 to 22, marginal plates. Fig. 3, diagram of plates of plastron or sternum ; 1, gular plates ; 1*a*, intergular ; 2, humeral ; 3, pectoral ; 4, abdominal ; 5, femoral ; 6, anal plates.

FREDERICK McCOY.

Pl. 84

ZOOLOGY OF VICTORIA

(Fishes)



A. Bartholomew del. et lith.

Prof. McCoy dirext

Steam litho, Govt. Printing Office

PLATE 84.

CTENOLATES AMBIGUUS (RICH. SP.).

THE MURRAY GOLDEN PERCH.

[Genus CTENOLATES (GÜNTH.). (Sub-kingd. Vertebrata. Class Pisces. Sub-class Teleostii. Order Acanthopterygii. Fam. Percidæ.)

Gen. Char.—Spinous dorsal of ten rays, continuous with the soft dorsal. Branchiostegals, seven; pseudobranchiæ distinct. Teeth villiform, in bands on the jaws and palate bones and vomer. Tongue smooth. Preoperculum finely serrated on straight posterior edge, with larger and less regular denticles directed slightly forwards in groups on undulated inferior edge. Lower edge of preorbital finely serrated. Scales of moderate size, finely serrated on posterior edge. Australia.]

DESCRIPTION.—Ovate; greatest depth under anterior part of dorsal, about twice and a half in the total length of the fish, excluding the caudal fin. Head cavernous, a row of 6 or 8 large mucous pits extending on each side of lower jaw and preoperculum, a few also larger ones above the preorbital plate. Length of the head slightly less than one-third of the total length, without caudal fin. Thickness about half the depth. Dorsal profile very convex from dorsal fin to occiput, concave from thence to end of snout, the concavity of profile greatest in large specimens, and above the occiput. Lower jaw slightly longer than upper, the maxillary reaching, when the mouth is closed, to a little behind the vertical from the anterior part of the orbit. Diameter of the eye one-half of the length of the snout, and one-fourth to one-fifth of the post-orbital length of the head, according to the age. Upper part of the head smooth and naked; cheeks covered with small scales, about half the size of those on the operculum. Denticles on lower edge of preoperculum in three or four rounded groups, directed forwards. Operculum with one strong triangular spine, little behind tip of soft posterior angle, with a second one a little in front of it on upper edge, sometimes broken into several little denticles, and a third, smaller one, about half way between angle and upper base. Spines of dorsal thick, strong, the 5th and 6th longest; 1st branched ray of dorsal exceeding last spinous ray by about one-half of its length; last branched ray about one-fourth more than the length of the last spine. The basal third of the dorsals covered with small scales. Caudal and pectoral rounded. 1st ventral ray lengthened. Three anal spines, very thick, the 1st little more than half the length of the 2nd. *Fin-rays:* Dorsal, 10 spinous, 11 branched; pectoral, 17; ventral, 1 spinous, 5 branched; anal, 3 spinous, 8 branched (last two with one base); caudal, 15 to 17, with 3 or 4 short rays above and below. *Scales:* Along the lateral line, about 82; above, 14 to 16; below, 29 to 32. The posterior edge of the coracoid (*a*) above the base of the pectoral, and of the suprascapular (*b*) above operculum, finely denticulated. *Color:* Purplish on top of head; sides of head with mixtures of green, purple, and yellow; back, rich yellowish bronze-green; sides, golden-yellow, fading into whitish on lower margin; scales of back and sides minutely speckled with black; spinous dorsal fin pale-purplish, the rays tawny-yellow, minutely dotted with black; soft dorsal, blackish towards edge; pectorals yellowish, the rays minutely dotted with black, membrane nearly colorless; ventral fins, membrane yellowish, rays orange; caudal, with the membrane brownish-purple, minutely dotted with black; anal, membrane purplish, rays dull orange, the hinder portion blackish towards margin. Iris golden-yellow, with an inner pearly-white ring, with reddish and purplish marks outside.

MEASUREMENTS OF TWO SPECIMENS.

	Ft.	ins.	lines.	Ft.	ins.	lines.
Total length to end of caudal	1	11	0	1	10	0
Length of head to end of operculum	0	6	0	0	5	6
„ from tip of snout to anterior edge of orbit	0	1	6	0	1	6
Diameter of orbit	0	0	8	0	0	8
Length from tip of snout to end of preoperculum	0	3	9	0	3	6
„ „ base of pectoral	0	6	0	0	5	10
„ „ „ ventral	0	6	9	0	6	4
„ „ first anal spine	1	2	0	0	11	5
Greatest depth	0	8	0	0	6	8
„ thickness	0	3	10	0	3	4
Length of pectoral	0	3	3	0	3	1
„ spine of ventral	0	1	9	0	1	5
„ 1st soft ray	0	3	7	0	3	2
„ 2nd „	0	2	7	0	2	6
„ 1st anal spine	0	0	11	0	0	10
„ 2nd „	0	1	8	0	1	9
„ 3rd „	0	1	5	0	1	6
„ 1st branched ray	0	2	4		—	
„ 1st dorsal spine	0	0	5	0	0	8
„ 2nd „	0	1	0	0	1	3
„ 5th „	0	1	10	0	2	0
„ 10th „	0	1	2	0	1	3
„ 1st branched ray	0	1	11		—	
„ caudal fin	0	2	4	0	2	4
Number of scales in one inch, about middle	Four			Five		

REFERENCE.— = *Datnia* (?) *ambigua*, Rich., Voy. Ereb. and Ter., t. 19 = *Dules auratus*, Castlenau, P.Z.S. Vict., vol. 1, p. 55 = *Ctenolates Macquariensis*, Günth., P.Z.S. 1871, t. 33.

The largest specimens are deeper in proportion to the length than the smaller, and have a more concave profile; and the eye, as usual, is smaller in proportion than in the younger ones.

This beautiful fish is much esteemed for the table, and is commonly about 3lbs. or 4lbs. weight. An enormous specimen, of which the dimensions are given in the first column, weighed 8¾lbs.

Dr. Richardson counts only six branchiostegal rays in his dried specimens, but there are seven in the fresh fish; and I think there can be no doubt of the correctness of the synonyms above quoted. The last anal ray by some may be counted as two, being divided to the base; and the number of scales counted along the lateral line depends very much on where you cease to count the small posterior ones; so these differences, which induced Count Castlenau to propose a new specific name, I think unimportant.

The gullet is wide ; the stomach with a wide blunt cæcum ; the pyloric appendages about eleven in number, and $\frac{3}{4}$ of an inch long ; the intestines with two turns. The swim-bladder is excessively thin, club-shaped, and about $1\frac{1}{2}$ inches wide. Liver bilobed.

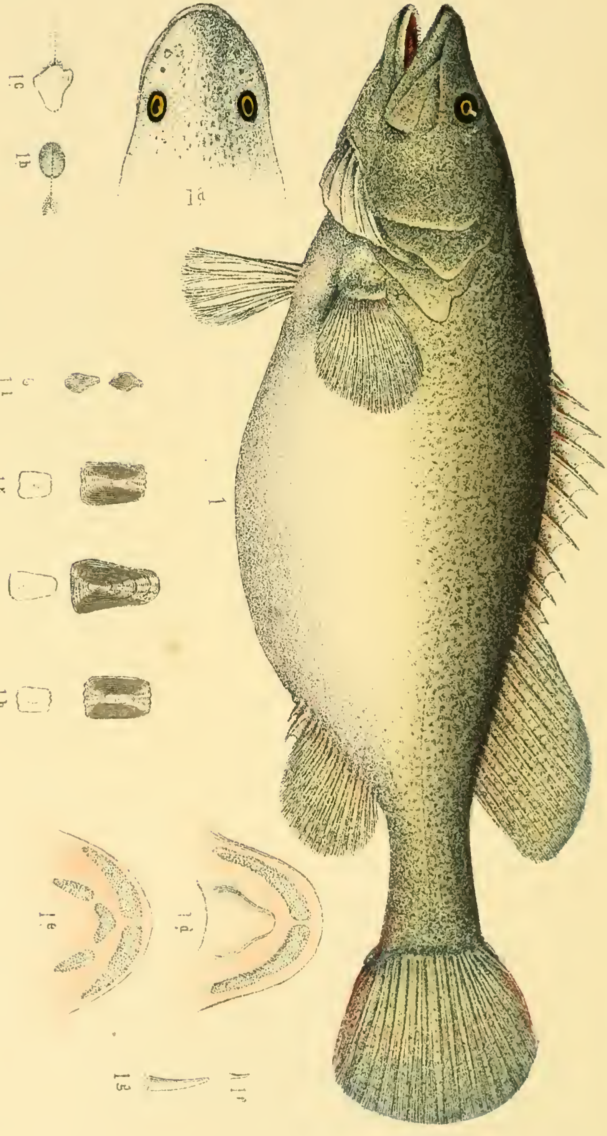
The general hue, like the fashionable color "old gold," is a most striking and beautiful characteristic of this fish, when fresh, distinguishing it from the many other Murray-River fish with which it comes plentifully to the market, and well warranting its popular name amongst the colonists of "Golden Perch." It has not been figured of its natural colors before.

Common in the River Murray and its branches, but not found in any river of Victoria flowing southwards to the sea.

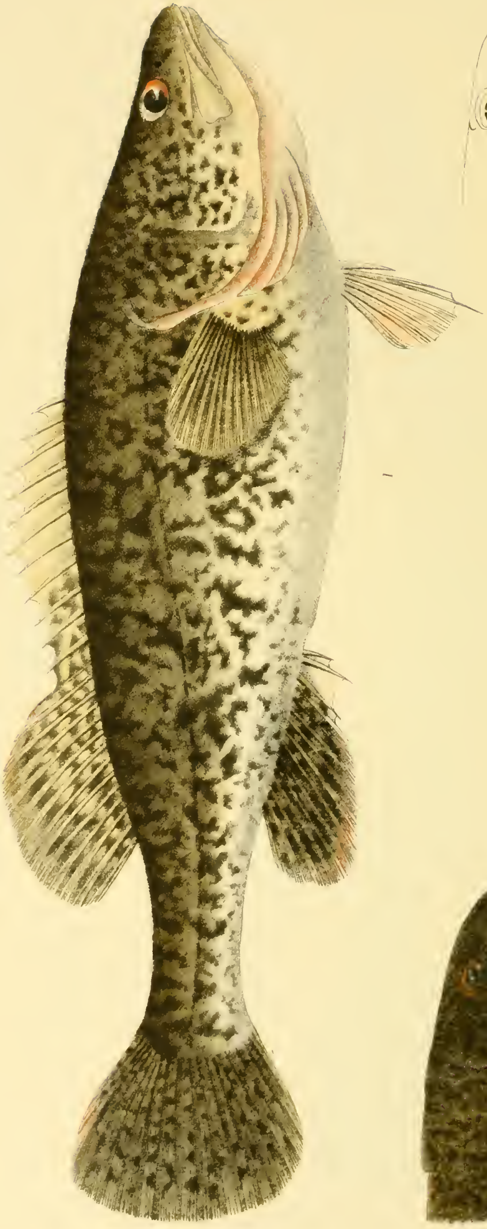
EXPLANATION OF FIGURES.

PLATE 84.—Fig. 1, side view, one-half the natural size. Fig. 1*a*, head, natural size of average specimen, to show the serratures of the hind edge of the preoperculum, preocular plate, and the groups of denticles directed forwards on the lower margin of the preoperculum, and large mucous pits on side of snout. Fig. 1*b*, portion of one side of under jaw to show the large mucous pits, natural size. Fig. 1*c*, inner view of mouth, natural size, showing the smooth tongue and the crowded rows of small teeth on the jaws, palatine bones, and vomer. Fig. 1*d*, olive scales near back, above lateral fin, natural size, to show coloring. Fig. 1*e*, yellow scales of sides below lateral line, natural size.

FREDERICK MCCOY.



Ludwig Becker del & lith. *Prof. M'Coy direxᵗ.* *Hamel & Cᵒ imp.*



1

1a

2

A. Bartholomew del. et lith.

Prof. McCoy direx.t

Steam litho Govt Printing Office

PLATES 85 AND 86.

OLIGORUS MACQUARIENSIS (CUV. AND VAL. SP.).

THE MURRAY COD-PERCH.

[Genus OLIGORUS (GÜNTHER). (Sub-kingd. Vertebrata. Class Pisces. Sub class Teleostii. Order Acanthopterygii. Fam. Percidæ.)

Gen. Char.—Branchiostegal rays seven. Teeth in villiform bands on the jaws, vomer, and palatine bones. No canines. Tongue smooth. One dorsal fin, with eleven spinous rays in front of the branched ones. Anal fin with three spines in front. Operculum with one point; sub-operculum with a smooth or obtusely denticulated edge. Scales very small. Pyloric cæca few. Australian rivers.]

DESCRIPTION.—*Form:* Regular elongate ovate, moderately compressed; greatest depth of body $4\frac{3}{4}$ times in total length to end of caudal fin in small specimens (a foot and a half long), but only $3\frac{1}{2}$ times in large individuals; thickness of body $\frac{5}{6}$ths of the depth. Edges of operculum, preoperculum, and suboperculum nearly smooth. One obscure spine a little within the margin and rounded posterior point of the operculum. Edge of the preoperculum with a slight undulation or imperfect dentation on the posterior margin and angle (perceptible only when dry). *Fin Rays:* Dorsal, 11 spinous and 15 branched; anal, 3 spinous and usually 12 or very rarely 13 branched; pectoral, 18 to 20 (usually 19), branched; ventral, 1 spinous and 5 branched, the anterior part of first branched ray considerably longer than the others; caudal, 20 (9 above and 11 below the middle). *Scales:* Along lateral line, 106 to 180; above lateral line at middle of body, 23 to 35; below lateral line, 38 to 70. *Color:* Ground color a yellowish-olive, becoming whitish on belly, and blackish on top of head and back, more grey in large old specimens; covered, except on belly, with dusky variable spots, very small, extremely numerous, and nearly equal in large old fish, much larger, fewer, and grouped in irregular angular cloudy clusters about half an inch or so long in smaller young examples; fins dark-olive with a purplish tinge and often red at the margins, except the ventrals, which are nearly white; anterior part of top of head blackish, without spots. Pancreatic cæca of pylorus, about 3.

REFERENCE.— = *Grystes Macquariensis* (Cuv. and Val.), v. 3, p. 58; *id.*, Rich., E. and T. Fish, p. 118, t. 53, f. 8, 9; = *G. Peeli* (Mitchell), Exp. Austr., t. 6, f. 1.

This great Cod-Perch is well known under the popular name of "Murray Cod" from its great abundance in the Murray River, and some fancied resemblance to a Cod, to which it has no affinity and little likeness. It is by far the largest of all our fresh-water fish, and is in request for the table all the year round. It sometimes reaches 100lbs. in weight, and examples of 40lbs. are common. It feeds voraciously on fish and crustacea; twenty full-grown specimens of the smaller Murray Crayfish *(Astacopsis bicarinatus)* were taken from the stomach of the specimen figured in our Plate 85, which measured three feet four and a half inches in length. The color varies considerably, the very large specimens being greyish with a slight, dull, greenish tinge above, but whitish on the belly; the dusky spots being very small and excessively numerous; while in the smaller specimens the spots are always much larger, and frequently clustered in angular patches, as in our Plate 86; these smaller specimens are more decidedly yellowish-olive in the ground color.

There is a very common opinion among the fish dealers and other observers that there are two distinct species confounded under the name of Murray Cod, the one with a narrow snout, and the other with a broadly-rounded blunt one, and it is easy to separate the two forms when a heap of the fish is sorted. I am convinced, however, that the difference is sexual, and that the two forms agree precisely in all the other proportions, the number of fin-rays, and in the number of scales along the lateral line and above and below it, as well as in coloring. The depth of the body I find also varies from $3\frac{1}{3}$ in the large to about $\frac{1}{5}$ in the small examples in the total length. The length of the orbit in the moderately large specimen (No. 1 of table of measurements given below) is contained about 9 times in the length of the head; in the next (No. 2) 8 times; in the next (No. 3) $7\frac{1}{2}$; in the next (No. 4) 7 times; in the smallest (No. 5) about 5 times; and in the largest (No. 6) it is contained about $10\frac{1}{2}$ times; bearing out the remark I have made, in relation to other fish, that the proportionate size of the eye is always larger in young or small individuals, and is gradually a less fraction of the length of the head or body in the older or larger individuals.

I give below the detailed measurements of several specimens to show the differences between the large and small in various proportions :—

—	No. 1. Moderately large Male. Plate 85	No. 2. Moderately large Female.	No. 3.	No. 4. Clouded, figured specimen. Plate 86.	No. 5. Small specimen.	No. 6. Very large specimen, 70 lbs. weight.
	ft.ins.lines.	ft.ins.lines.	ft.ins.lines.	ft.ins.lines.	ft.ins.lines.	ft.ins.lines.
Length from snout to distal end of middle of caudal	3 4 6	3 0 0	2 4 0	1 7 6	1 0 3	4 7 9
„ of caudal to middle	0 4 10	0 4 10	0 3 6	0 2 5	0 1 9	0 5 9
„ of snout to anterior edge of orbit	0 3 0	0 2 3	0 1 9	0 1 4	0 0 9	0 4 3
Distance between orbits	0 2 6	0 2 2½	0 2 0	0 1 5	0 0 7	0 4 0
Length of orbit	0 1 3	0 1 2	0 1 0	0 0 8½	0 0 6	0 1 6
„ of head from snout to end of operculum	0 11 4	0 9 9	0 7 7	0 5 6	0 3 0	1 3 9
„ from snout to anal (measured along ventral edge) ...	2 3 0	2 0 0	1 4 6	0 11 6	0 6 9	3 0 9
„ from front of anal to end of middle of caudal	1 4 0	1 2 6	1 0 6	0 9 3	0 5 6	1 11 6
„ from snout to base of pectoral	1 0 7	0 11 3	0 7 9	0 5 4	0 3 4	1 5 6
„ „ to origin of dorsal	1 6 0	1 1 6	0 9 7	0 6 9	0 4 3	1 9 0
„ „ to first branched ray of dorsal ...	2 1 0	1 9 6	1 3 6	0 10 11	0 6 9	2 9 0
„ „ to origin of ventral fin	0 9 9	0 9 6	0 7 9	0 5 3	0 3 0	1 5 0
Height of 1st ray of dorsal... ...	0 0 9	0 0 9	—	0 0 7	0 0 5	0 1 3
„ 2nd „	0 1 4	0 1 4	0 0 10	0 0 11	0 0 8	0 1 7
„ 5th spine of dorsal ...	0 1 9	0 2 0	0 1 6	0 1 5	0 1 0	—
Greatest height of soft rays of dorsal	0 4 0	0 4 0	0 3 0	0 2 1	0 1 5	0 4 9
Length of pectoral	0 4 4	0 4 0	0 3 4	0 2 0	0 1 6	0 5 2
„ longest ray of ventral ...	0 3 10	0 3 10	0 3 6	0 2 3	0 1 5	0 5 6
„ 2nd „ „ ...	0 3 9	0 3 6	0 2 10	0 1 9	0 1 2	0 4 9
Depth of anal	0 3 6	0 3 6	0 3 0	0 2 0	0 1 6	0 4 9
Length of anal	0 4 6	0 3 10	0 3 10	0 3 0	0 1 9	0 6 8
Depth of body in front of dorsal ...	0 11 6	0 9 6	0 7 3	0 4 3	0 2 9	1 1 0
Thickness of body in front of dorsal...	0 8 0	0 6 0	0 5 0	0 3 0	0 1 10	0 9 0
	No.	No.	No.	No.	No.	No.
Scales in 1 inch at middle of body ...	6	7	6½	10	15	4
„ along lateral line	122	117	115	127	109	186
„ above lateral line under front of dorsal	30	32	27	30	28	28
„ below lateral line under front of dorsal	51	38	45	30	53	70

Very abundant in the Murray and all the rivers flowing into it, but not found naturally in any of the rivers of Victoria flowing south. The Acclimatisation Society many years ago introduced it for the first time into the Yarra, where it is now established, but does not thrive, although its voracity has sensibly diminished the numbers of several of the native fishes of that river, particularly the Blackfish (*Gadopsis gracilis*) and the Yarra Herring or Australian Grayling (*Prototroctes marœna*), which have now disappeared from the lower parts of the Yarra altogether.

EXPLANATION OF FIGURES.

PLATE 85.—Fig. 1, moderately large specimen (3 feet 4½ inches long) (the first branched ray of ventral not long enough); to show form and small spots of old fish. Fig. 1*a*, snout, viewed from above. Fig. 1*d*, inner view of mouth, showing bands of villiform teeth on lower jaw, and smooth tongue. Fig. 1*e*, inner view of upper jaw, showing crowded small villiform teeth on jaw, vomer, and palatine bones. Fig. 1*f*, one of the teeth, natural size. Fig. 1*g*, one of the teeth magnified. Figs. 1*h*, 1*i*, 1*k*, 1*l*, scales, natural size and magnified.

PLATE 86.—Fig. 1, small specimen, ⅜ the natural size (1 foot 7½ inches in length), showing the angular patches of large spots of the young. Fig. 1*a*, top view of head of same broad-snouted specimen. Fig. 2, outline of top of head of narrow-snouted specimen of about same size.

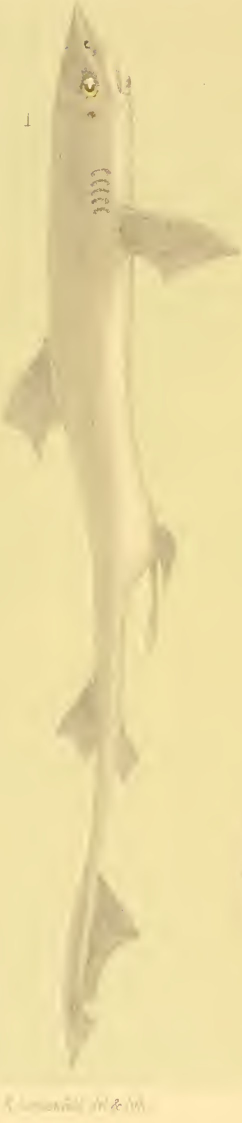
FREDERICK McCOY.

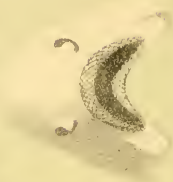
MEMOIRS OF THE MUSEUM

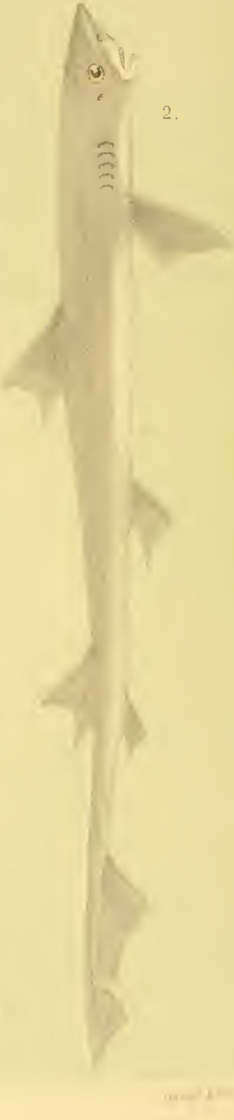
Pl. 7.

ZOOLOGY OF VICTORIA

(Pisces)







[illegible] del & lith. [illegible] direx. [illegible]

PLATE 87.

MUSTELUS ANTARCTICUS (GÜNTH.).

THE AUSTRALIAN SMOOTH-HOUND.

[Genus MUSTELUS (CUV.). (Sub-kingd. Vertebrata. Class Pisces. Order Plagiostomata. Sub-order Selachoidea. Fam. Carcharidæ. Sub-fam. Mustelinæ.)

Gen. Char.—Form tapering, moderately compressed. Five small gill-slits, the three anterior in front of pectoral. Two dorsals without spines, and moderate ventral and anal fins: caudal moderate, extremity of body scarcely elevated, a notch in distal lobe; basal lobes moderate. Nostrils with a very long narrow triangular lobe from anterior edge, and a small lobe from posterior margin. Mouth moderately arched, with strong prominent cartilages and a deep fold about each angle. Teeth very numerous, small, rhomboidal, flat, like a tiled pavement, of many alternate rows; the posterior rows in some species with a slight short median point, and one still smaller at one side. Spiracles moderate, a little behind and below the posterior corner of eye; eye elongate. A nictitating membrane. No pit in front of caudal. Scales very small, triangular, tricarinate. Cosmopolitan.]

DESCRIPTION.—Head semi-oval, flattened, pre-oral portion about equal to the width of mouth. Eyes approximate, lengthened with a thick fold below, forming the nictitating lid, their anterior edges about as far from tip of snout as from each other. Spiracle a little behind the eye. First dorsal small, entirely behind the inner posterior lobe of pectoral, or very slightly in front of it, a little nearer to snout than to the second dorsal; anterior and posterior bases of anal a little behind the corresponding parts of second dorsal; space between dorsals two and a half in length of the base of second dorsal. Tail very slightly elevated; notch in distal lobe of caudal fin deep and narrow. *Color:* Back and sides ashy-grey, with a slight pinkish-brown tinge on side of head and body; with, from nape to second dorsal, very small lighter spots on back and sides above lateral line; lower lip, lower third of sides, whole under surface of body, and under side of pectorals and ventrals, milk-white; hind edge of dorsals and tip of caudal blackish; iris mottled green and brown bronze, darker above and below. Teeth in about seven rows, the inner angle slightly prominent as a very obtuse cusp on the inner rows.

MEASUREMENTS.				SMALL FEMALE.		
	Ft.	ins.	lines.	Ft.	ins.	lines.
Total length to end of upper lobe of caudal	3	5	0	1	11	0
Length from snout to origin of 1st dorsal	1	1	0	0	7	1
„ of base of 1st dorsal	0	3	9	0	2	6
Height of 1st dorsal	0	4	0	0	2	9
Length of posterior lobe of 1st dorsal	0	1	7	0	1	1
„ from snout to anterior base of 2nd dorsal ...	2	3	0	1	2	0
„ of base of 2nd dorsal	0	3	0	0	2	0
Height of anterior part of 2nd dorsal	0	3	3	0	2	2
Length of posterior lobe of 2nd dorsal	0	1	2	0	0	10
„ from anterior origin of base of caudal fin to tip of upper lobe	0	6	4	0	4	6
„ from anterior base of 2nd dorsal to commencement of caudal	0	7	5	0	4	9
„ of anterior edge of lower lobe of caudal ...	0	2	10	0	2	0
„ from snout to anterior base of pectoral	0	8	9	0	4	9
„ of base of pectoral	0	2	0	0	1	5
„ of anterior margin of pectoral	0	5	0	0	3	2

Measurements—*continued.*

	Ft.	ins.	lines.	Small Female. Ft.	ins.	lines.
Greatest width of pectoral	0	4	6	0	2	10
Length of hind edge of pectoral to anterior edge of ventral	0	10	2	0	5	6
„ of base of ventral	0	2	2	0	1	3
„ of anterior margin of ventral	0	2	3	0	1	5
„ from tip of snout to upper edge of nostril	0	1	9	0	1	3
„ „ anterior edge of orbit	0	2	4	0	1	11
„ „ spiracle	0	4	3	0	2	10
„ of orbit	0	1	2	0	0	7
„ of nostril	0	0	7	0	0	6
Diameter of spiracle	0	0	3	0	0	3
Width of mouth	0	2	1	0	1	6
Length from tip of snout to middle of front edge of mouth	0	2	2	0	1	7
„ of 1st gill-opening	0	1	1	0	0	6
Girth behind pectoral	1	2	0	0	7	9
Number of scales about middle of body in 1 line	Eight.			Ten.		
Number of teeth in middle of jaw in 3 lines	Five.			Six.		

Reference.—Günther, Cat. Fish. B. M. v. viii., p. 387.

This fish is a close representative of the European "Smooth-Hound" or Ray-mouthed Dog-fish, as the species of this genus are well called, from the blunt pavement of small, close, flat teeth, like those of a Skate or Ray, and I have continued the epithet "smooth," as, like the European species, the skin is softer and smoother than in other Sharks or Dog-fish. On comparison with the English *Mustelus vulgaris*, the Australian representative has a slightly smaller and more deeply notched 1st dorsal, which is also set much farther back than in *M. vulgaris*, its anterior margin in *M. Antarcticus* being clearly behind the inner posterior lobe of the pectoral in most specimens, but in a fresh female now before me it is slightly in front of it. A comparison of our figure with the similarly-sized Cornish one in "Couche's Fishes of British Islands," vol. 1, p. 47, will show these characteristic differences clearly; although the 1st dorsal is too large and not sufficiently notched, and there should be only one gill-opening behind the anterior edge of pectoral; the English fish, I find on comparison of specimens, agreeing in these respects with the Australian one. In other respects they are singularly alike, and agree altogether in food and habits.

This harmless little Dog-fish, feeding only on Zoophytes and Crustacea and small shell-fish, was among those for which the Victorian Government was induced to pay the fishermen, by measurement, for their destruction, some hundreds of pounds during the years the vote appeared on the Estimates for the destruction of Sharks on our shores—this little blunt-toothed creature being accepted as the young of the gigantic White and Shovel-nosed Sharks, whose sharp teeth made havoc with fish, nets and men. There were no figures of our fishes to guide the well-intentioned blunderers at the time. It is much less prolific than the Picked Dog-fish, and the viviparous young have no placenta.

As usual in the genus, there is a small ridge from behind the head to the 2nd dorsal, and in this species continued thence to the caudal, and a smaller ridge from the anal to the caudal fin; there is no pit at base of caudal.

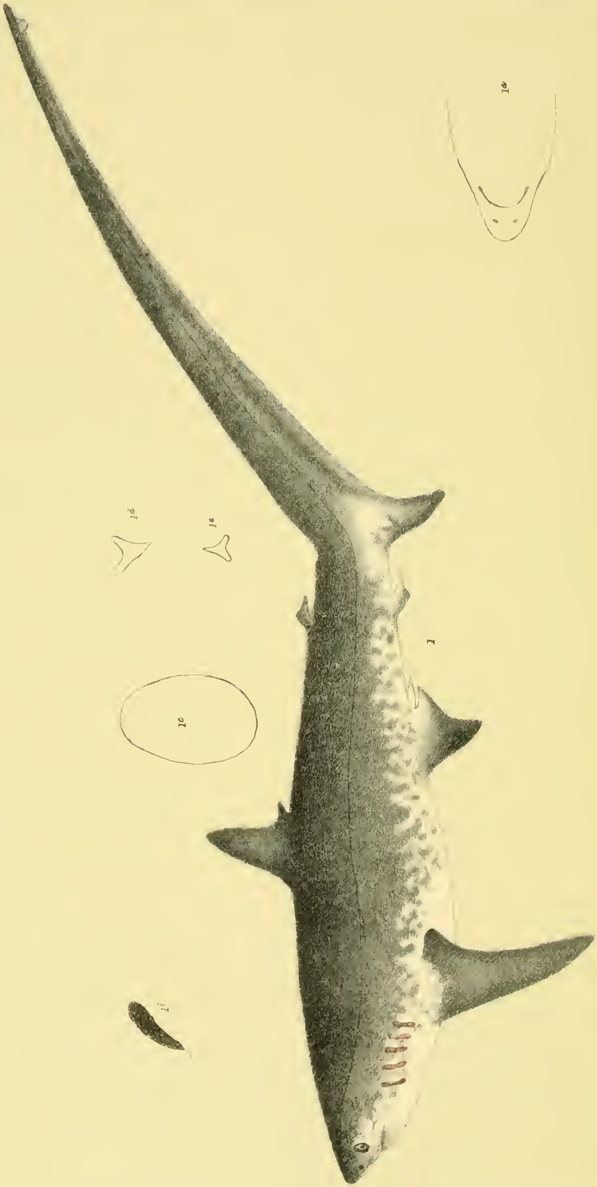
This fish is here figured of its natural colors for the first time.

Common in Hobson's Bay.

EXPLANATION OF FIGURES.

PLATE 87.—Fig. 1, side view of male, one-sixth of natural size (the lower acute lobe of first dorsal scarcely elongate enough). Figs. 1*a* and 1*b*, teeth, twice natural size. Fig 2, side view of snout, one-seventh natural size. Fig. 2*a*, outline of under-side of head, one-third natural size, to show the form of snout, the valves of nostril, and the mouth. Fig. 2*b*, mouth and teeth, natural size. Figs. 1*c* and 1*d*, teeth, magnified two diameters.

FREDERICK MCCOY.



A. Bartholomew del et lith

Prof. McCoy direx.

Stearn litho Govt. Printing Office

PLATE 88.

ALOPECIAS VULPES (LINN. SP.).

THE THRESHER, OR LONG-TAILED SHARK.

[Genus ALOPECIAS (MÜLL. AND HEN.). (Sub-kingd. Vertebrata. Class Pisces. Order Plagiostomata. Sub-order Selachoidea. Family Lamniidæ.)

Gen. Char.—First dorsal fin opposite to the space between the pectoral and ventral fins; the second dorsal and anal fins very small; the anal a little behind the second dorsal. Caudal fin of extraordinary length, with a pit at its base. No nictitating eyelid. Spiracles very minute, close behind the eye. Teeth nearly alike in both jaws, no middle tooth, the upper a little oblique, of moderate size, the third on each side in upper jaw much smaller than the adjoining ones, flat, triangular, with smooth edges. Gill-openings small or of moderate width, the two last very close together and over the base of the pectoral. Skin nearly smooth, with very minute scales, each with three slight keels.]

DESCRIPTION.—Body cylindrical until near tail, when it is strongly compressed laterally. Snout obtusely pointed, its length slightly less than the distance apart of the orbits. Mouth small. Nostrils very small. Pectorals very long, narrow, falcate, with a distinct posterior lobe at base. First dorsal high, triangular, with a projecting posterior lobe at base. Ventrals moderate, with a very long, narrow posterior lobe at base. Second dorsal very small, a little in front of the anal, which is similar in size and shape, each being oblong with a very long, slender prolongation of the posterior terminal angle. Pit above at base of caudal, with a prominent ridge in front of it. Upper lobe of caudal excessively long, much compressed, gradually tapering to a narrow, rounded distal extremity, bordered below by a narrow fin, widened into a small lobe near the point. Lower lobe of caudal triangular, of moderate size. Gill-openings very small, the two hinder gill-openings behind the anterior edge of the pectorals. *Color:* Above, dull bluish-grey, fading to whitish on the belly, with intermediate, irregular, grey, cloudy spots.

MEASUREMENTS.

	Ft.	ins.	lines.
Length from tip of snout to base of upper lobe of caudal ...	5	1	0
„ of upper lobe of caudal	5	1	0
„ of lower lobe of caudal	0	7	0
„ from tip of snout to anterior edge of orbit ...	0	3	5
Diameter of orbit	0	1	3
Length from posterior edge of orbit to spiracle	0	2	0
Diameter of spiracle	0	0	1½
Length from tip of snout to nostril	0	2	6
„ of nostril	0	0	6
„ from tip of snout to anterior edge of mouth ...	0	4	0
„ „ „ „ gill-opening ...	1	0	0
„ „ „ base of pectoral ...	1	4	9
„ „ „ „ 1st dorsal ...	2	5	0
„ „ „ „ 2nd dorsal ...	4	5	0
„ „ posterior edge of last gill-opening	1	6	6
„ „ anterior base of ventral ...	3	4	9
„ „ „ edge of anal fin ...	4	8	0
Height of 1st gill-opening	0	2	0
„ last gill-opening	0	2	6

MEASUREMENTS—*continued.*	Ft.	ins.	lines.
Width of mouth	0	4	0
,, between middle of upper edge of orbits	0	4	0
Length from tip of snout to line connecting middle of upper edge of orbits	0	4	0
,, of base of pectoral	0	7	6
,, anterior edge of pectoral	1	5	0
,, base of 1st dorsal	0	7	6
,, anterior edge of 1st dorsal	0	10	3
,, base of 2nd dorsal	0	1	0
,, anterior edge of 2nd dorsal	0	1	0
,, posterior edge of 2nd dorsal	0	1	6
,, base of anal	0	1	0
,, anterior margin of anal	0	1	2
,, posterior ,, ,,	0	1	9
Width of fin bordering the middle of upper caudal lobe, on lower edge	0	0	7
Width of lobe of same at point	0	0	3½
Depth in front of 1st dorsal	1	1	0
Length of upper tooth next middle from apex to middle of base	0	0	3
Width ,, ,, ,, ,,	0	0	3
Length of lower tooth ,, ,, ,,	0	0	2½
Width ,, ,, ,, ,,	0	0	2½

REFERENCE.— = *Squalus vulpes* (Lin.), Syst. Nat. v. 1, p. 1496 = *Alopecias id.* (Müll. & Hen.) Plagiost., p. 74, t. 35, f. 1; Couch, F.B.L., v. 1, t. 7.

This most curious Shark differs from all others in the inordinate length of the upper lobe of the tail, which varies a little, but about equals the whole body in length, or is usually a little over half the total length.

The name "Thresher" arises from the strange habit this fish has of giving loud sounding blows to whales and other large bodies in the sea with its long slender tail as a thresher does with his flail. The Fox-Shark is a common name in England for this species. It is one of the rarest Sharks of our seas, only two examples having occurred to my knowledge on the Victorian coasts; of one of which a sketch was sent to me many years ago by a fisherman at Hastings, and the figured specimen from the same place is now in the Museum at Melbourne. It is perfectly identical in all respects with the European species, and thus is one of the few fishes having a perfectly world-wide distribution.

EXPLANATION OF FIGURES.

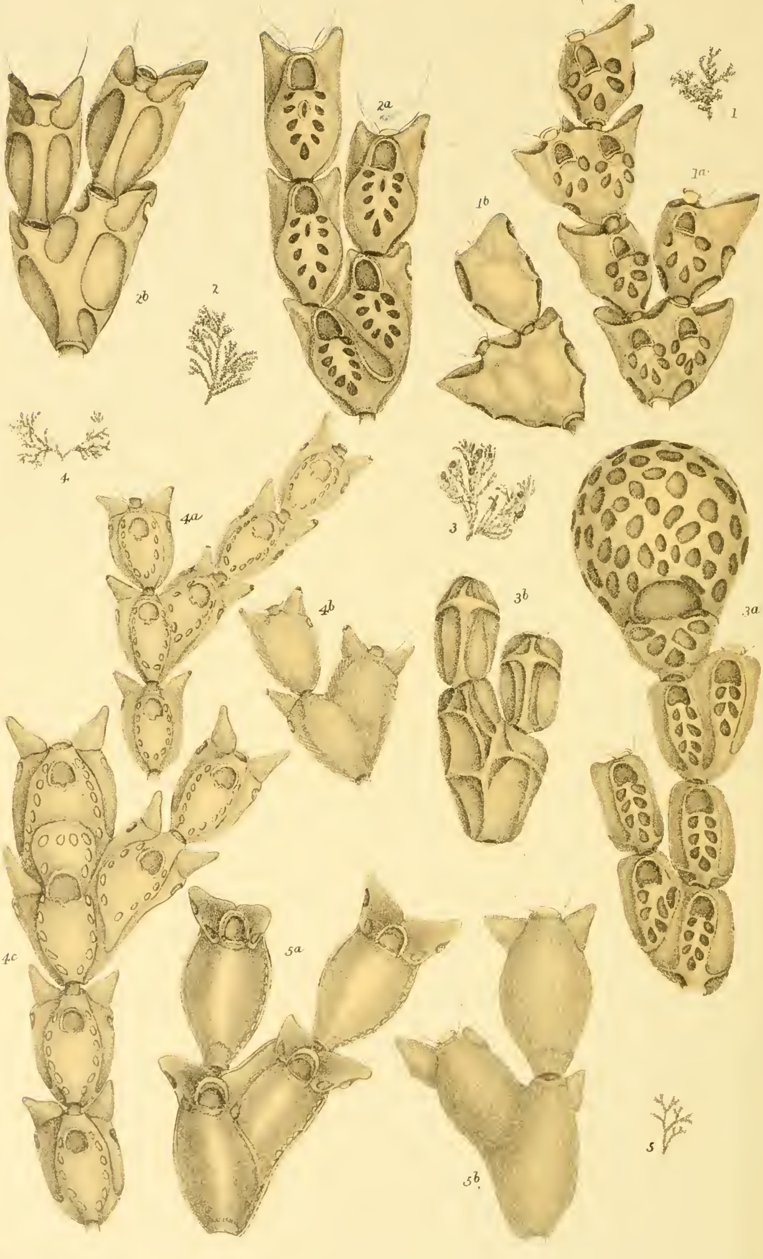
PLATE 88.—Fig. 1, side view, reduced to 1-15th natural size. Fig. 1*a*, under view of head to show form of mouth and position of nostrils. Fig. 1*b*, nostril, natural size. Fig. 1*c*, form of section at hinder third of body. Fig. 1*d*, upper tooth, natural size. Fig. 1*e*, lower tooth, natural size.

FREDERICK McCOY.

79

Catenicella

(Polyzoa)



Ripper del et lith. Prof Mc Coy dirext Steam litho Govt. Printing Office

PLATE 89, FIG. 1.

CATENICELLA INTERMEDIA (P. McG.).

[Genus CATENICELLA (BLAINV.). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-ord. Cheilostomata. Fam. Catenicellidæ.)

Gen. Char.—"Cells arising one from the upper and back part of another by a short corneous tube, all facing the same way and forming dichotomously divided branches of an erect phytoid polyzoary; cell at each bifurcation geminate; each cell with two lateral processes, usually supporting an avicularium. Ovicells either subglobose and terminal, or galeriform and placed below the opening of a cell in front."]

DESCRIPTION.—Cells large, broad, rounded. Mouth lofty, narrow, arched above, lower lip slightly rounded upwards and forwards, and sometimes with a very minute sinus in the centre. Front with 5 large fenestræ. Lateral processes very wide, forming a wide cup above, and with a depression for a large avicularium on the outside. Back of cell smooth.

REFERENCE.—P. H. MacGillivray, Trans. Roy. Soc. Vict. 1868.

Port Phillip Heads.

It may be distinguished from *C. plagiostoma* by the nearly vertical mouth, the smaller fenestræ, and the absence of the peculiar enormous avicularia. The lateral process is usually absent or abortive on one side.

EXPLANATION OF FIGURES.

PLATE 89.—Fig. 1, fragment, natural size. Fig. 1*a*, front of cells, magnified. Fig. 1*b*, back of cells, magnified.

PLATE 89, FIG. 2.

CATENICELLA AMPHORA (BUSK).

DESCRIPTION.—Cells oval. Mouth arched above, nearly straight below. Front with a narrow, vertical, elliptical opening below the mouth, and a series of 9 pyriform fenestræ radiating to the circumference. Lateral processes of considerable size, occupying the upper angles, and produced into short points directed upwards, of nearly equal size; on one or both, below the point, is a small avicularian chamber. Back of cell smooth, with a broad, elevated, vertical band, giving off on each side a narrower band to the back of the avicularium.

REFERENCE.—Busk, Brit. Mus. Cat. Mar. Polyzoa, Pt. i. p. 8, pl. iv. f. 4, 5.

Port Phillip Heads, Mr. J. B. Wilson.

The beautiful vase-like shape of the cells and avicularian processes, with the anterior vertical slit and regular pyriform fenestræ, are sufficiently characteristic of this species.

Explanation of Figures.

Plate 89.—Fig. 2, portion, natural size. Fig. 2*a*, front view of cells, magnified. Fig. 2*b*, back of cells, magnified.

Plate 89, Fig. 3.

CATENICELLA WILSONI (P. McG.).

Description.—Cells large, squared at both ends. Mouth deeply arched above, the lower lip straight and entire. A space down the centre of the cell, of the same width as the mouth, occupied by a double row of (usually) 7 large, closely set, shallow fenestræ. The sides slope backwards from the margin of the fenestrate area, forming on each side a smooth, slightly hollowed space, nearly as wide as the central division, with an avicularian chamber at the upper angle. Back of cell with a prominent central band, extending the whole length, and, at about a third of the distance from the top, giving off a similar transverse band on each side. Ovicell large, rounded, terminal.

Reference.—P. H. MacGillivray, Trans. Roy. Soc. Vict. 1880.

Port Phillip Heads, Mr. J. B. Wilson.

This handsome species cannot be confounded with any other. It is distinguished by the size of the cells and the regular space down the front occupied by the close-set double row of foramina. This is in reality the true front of the cell, the sloping spaces at the sides corresponding to the lateral processes of other species. At the upper angle there is a minute avicularian chamber. The ovicell is of great size, terminal, thickly covered with large, rounded fenestræ. The cell which it surmounts springs from one of a geminate pair; it differs from the others in being short, wide, without lateral extensions, and, instead of the regular fenestrate area, having a variable number of 3–5 large fenestræ; there is also usually a bulging on each side of the lower lip, seemingly supporting a horizontal avicularium.

Explanation of Figures.

Plate 89.—Fig. 3, branch, natural size. Fig. 3*a*, portion, showing front of cells and ovicell, magnified. Fig. 3*b*, back of cells, magnified.

PLATE 89, FIG. 4.

CATENICELLA PULCHELLA (MAPLESTONE).

DESCRIPTION.—Cells elliptical, or, including the wide lateral processes, vase-shaped. Mouth arched above; lower lip nearly straight, with a deep rounded sinus. A close series of about 12 (5 or 6 on each side) rounded fenestræ arranged along the margin of the cell. The very wide lateral processes extending the whole length of the cell, divided into two portions by a partition extending outwards and downwards from the top of the cell; the upper part triangular, with the point directed upwards and outwards. In the outer edge, immediately below the partition, is a small avicularian cup. Back of cell minutely sulcate. Ovicell rounded, flat, situated on the front of a cell sessile on one of a geminate pair.

REFERENCE.—Maplestone, Journ. Mic. Soc. Vict., May 1880 = *C. concinna*, P. H. MacGillivray, Tr. Roy. Soc. Vict. 1880.

Queenscliff, Mr. Maplestone; Port Phillip Heads, Mr. J. B. Wilson.

The only specimens I have examined are mounted in balsam by the carbolic acid process, which has made them excessively transparent. Mr. Maplestone describes the cells as "with a row of small bosses or beads round the sides and lower portion of the cell," and the ovicell as "galeriform, ornamented with bosses and surmounted by two avicularia, geminate, not terminal." In my specimens the markings are certainly fenestræ, but in others they might be projections either from, in the young state, being covered by a bulging membrane, or being obscured by a calcareous overgrowth. In the description of the ovicell, Mr. Maplestone has evidently not distinguished between the ovicell itself and the cell to the lower part of which it is adherent.

EXPLANATION OF FIGURES.

PLATE 89.—Fig. 4, natural size. Fig. 4*a*, portion, magnified to show the front of the cells. Fig. 4*b*, back of cells, magnified. Fig. 4*c*, front of another portion, magnified, to show the ovicell.

PLATE 89, FIG. 5.

CATENICELLA UTRICULUS (P. McG.).

DESCRIPTION.—Cells contracted above and below. Mouth arched above, lower lip with a wide shallow sinus. Front smooth, or very finely papillose. A very narrow, entirely marginal vitta the whole length of the cell on each side. Lateral processes triangular, extending forwards and outwards from each side of the mouth, with a small avicularium on the outer edge, and frequently a small pyriform mark (probably avicularian) at the base in front. Back of cell very finely sulcate.

Warrnambool, Mr. H. Watts.

I have only seen two minute fragments of this species, which were sent in a slide to the Museum. The cells are ovate or pyriform, contracted above and below. The avicularian processes are triangular and ear-like, limited in extent to the depth of the mouth, from the sides of which they directly rise; the superior margins above the mouth are closely contiguous, although not quite continuous. On the edge of the lateral process is usually a small avicularium, and at the junction of the lower angle with the cell is frequently a triangular mark, which may possibly indicate another avicularium.

EXPLANATION OF FIGURES.

PLATE 89.—Fig. 5, natural size. Fig. 5*a*, front of cells, magnified; the very shallow sinus is not shown in the lower lip. Fig. 5*b*, back of cells, magnified.

The specimens and descriptions of the above *Catenicellæ* are contributed by Mr. MacGillivray.

FREDERICK McCOY.

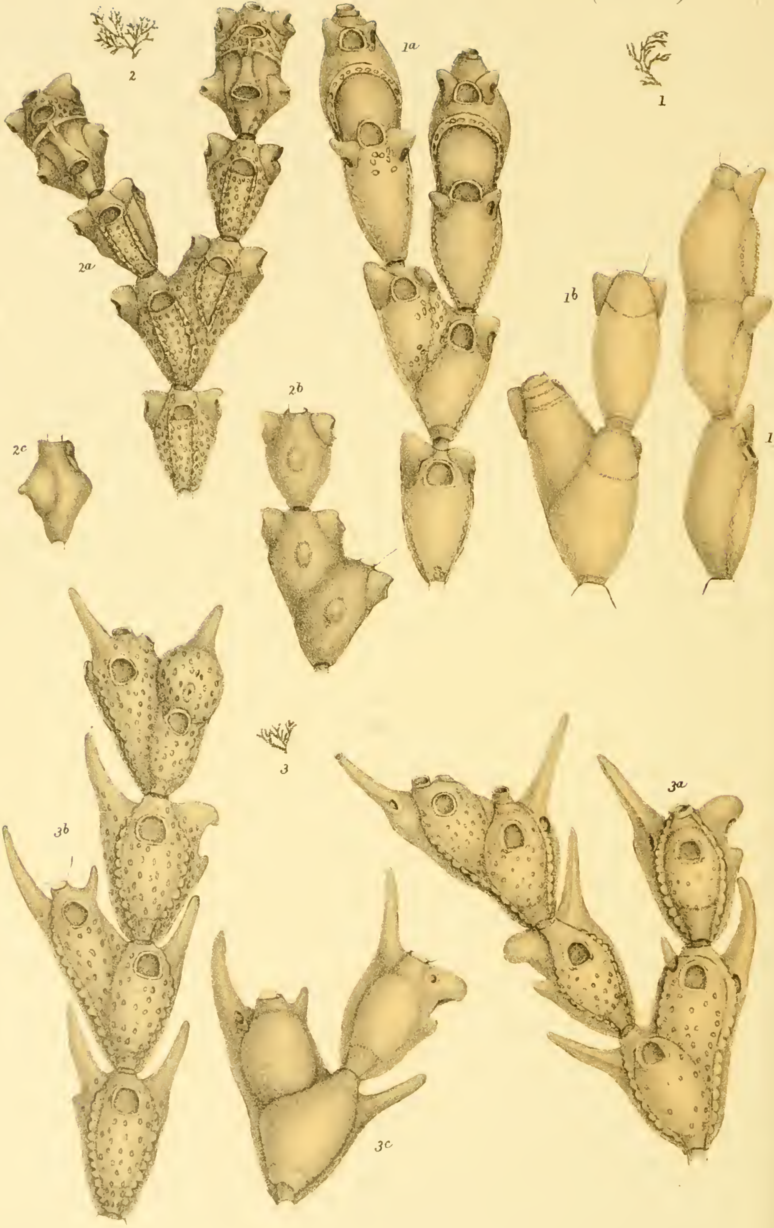
10

[illegible]

Pl. 90

ZOOLOGY OF VICTORIA

(*Polyzoa*)



J. Rupper del. et lith.   Prof. McCoy direxᵗ   Steam litho. Govt. Printing Office

PLATE 90, FIG. 1.

CATENICELLA FUSCA (P. McG.).

DESCRIPTION.—Cells elongated, narrow, bulging posteriorly. Mouth arched above, lower lip slightly hollowed. Surface smooth or slightly papillose. Vittæ entirely lateral, extending the whole length of the cell. Lateral processes small, stout, conical, directed forwards, with a minute avicularium at the base of the external margin. Ovicell cemented to the front of the cell above, which is sessile on the ovicelligerous cell, front flat or slightly hollowed, with a beaded margin.

Queenscliff.

Forms large, handsome, greyish-brown tufts, the large stalks chestnut-red. It is closely allied to *C. Buskii.*

EXPLANATION OF FIGURES.

PLATE 90.—Fig, 1, natural size. Fig. 1*a*, front of branch, magnified. Fig. 1*b*, back of small portion, magnified. Fig. 1*c*, profile view, to show the bulging of the back of the cells and the flat front of the ovicell.

PLATE 90, FIG. 2.

CATENICELLA UMBONATA (BUSK).

DESCRIPTION.—Cells small, wide above, narrowed below, bulging forwards. Mouth arched above, lower lip hollowed. Surface minutely papillose. Vittæ anterior, extending from the base of the cell to the lower lip. Lateral processes with an avicularium in a deep cup beneath the upper angle. Posterior surface smooth, with a prominent umbo in the middle. Ovicell cemented to the cell above, which is sessile on the ovicelligerous cell, with a broad vertical ridge and a raised smooth or beaded margin.

REFERENCE.—Busk, Brit. Mus. Cat. Mar. Polyzoa, Pt. i., p. 11, pl. x., f. 4, 5.

Port Phillip Heads.

Forms small glassy tufts on other zoophytes.

EXPLANATION OF FIGURES.

PLATE 90.—Fig. 2, natural size. Fig. 2*a*, portion of branch to show the front, magnified. Fig. 2*b*, back of geminate and ordinary cell, magnified. Fig. 2*c*, cell in profile, to show the projection of posterior umbo.

PLATE 90, FIG. 3.

CATENICELLA CORNUTA (BUSK).

DESCRIPTION.—Cells elongated, papillose in front. Vittæ lateral, extending the whole length of the cell. One or both lateral processes long, pointed and recurved, frequently with a small aperture at the base. Ovicell galeate, surmounting one of the cells of a geminate pair, terminal, with a sharp spine on the summit.

REFERENCE.—Busk, Voy. Rattl., i. 361; Cat. Mar. Pol. Brit. Mus., pt. i. p. 11, pl. 10, f. 1, 2, 3.

Queenscliff.

Forms small greyish tufts, 1 to 2 inches high. The only species with which it is likely to be confounded is *C. perforata*, from which it may be distinguished by the retrocedent, spinous, lateral processes, and by the spine on the summit of the ovicell. The long spine is frequently absent on one or both sides, and in its place is a lateral process with a wide, gaping hollow, in which is lodged an avicularium.

EXPLANATION OF FIGURES.

PLATE 90.—Fig. 3, natural size. Fig. 3*a*, front, magnified. Fig. 3*b*, another branch, showing an ovicell with its superior spine. Fig. 3*c*, back of cells, magnified.

The typical specimens and descriptions of the above *Catenicellæ* are from Mr. MacGillivray.

FREDERICK McCOY.

By Authority: JOHN FERRES, Government Printer, Melbourne.

CONTENTS OF DECADES.

N.B.—The originals of all the Figures are in the National Museum, Melbourne.

DECADE I.

Plate 1.—The Black Snake (Pseudechys porphyriacus, Shaw sp.).
Plate 2.—The Copper-head Snake (Hoplocephalus superbus, Günth.).
Plate 3.—The Tiger Snake (Hoplocephalus curtus, Schl. sp.).
Plate 4.—The Australian Bream (Chrysophrys Australis, Günth.).
Plate 5.—The Spiny-sided Butterfly-Gurnard (Lepidotrigla Vanessa, Rich. sp.).
Plate 6.—The Kumu Gurnard (Trigla Kumu, Lesson and Garn.).
Plate 7.—The Australian Giant Earth-worm (Megascolides Australis, McCoy).
Plate 8.—Lewin's Day-moth (Agarista Lewini, Boisd.).
The Loranthus Day-moth (Agarista Casuarinæ, Scott).
The Vine Day-moth (Agarista Glycine, Lewin sp.).
Plate 9.—Pieris (Thyca) Harpalyce (Don. sp.).
Plate 10.—Pieris (Thyca) Aganippe (Don. sp.).

DECADE II.

Plate 11.—The Little Whip Snake (Hoplocephalus flagellum, McCoy). The White-lipped Snake (Hoplocephalus coronoides, Günth.).
Plate 12.—The Death Adder (Acanthophis Antarctica, Shaw sp.).
Plate 13.—The Carpet Snake (Morelia variegata, Gray).
Plate 14.—The Gippsland Perch (Lates colonorum, Günth.).
Plate 15.—The Murray Lobster (Astacoides serratus, Shaw sp.).
Plate 16.—The Salmon Arripis (Arripis truttaceus, Cuv. sp.). Adult.
Plate 17.—Ditto of the younger forms and coloring.
Plate 18.—The Horse Mackerel (Trachurus trachurus, Lin. sp.).
Plate 19.—The Small-scaled Rock Cod (Lotella callarias, Günth.).
Plate 20.—The Australian Rock Cod (Pseudophysis barbatus, Günth.).

DECADE III.

Plate 21.—The Sea-Leopard Seal (Stenorhynchus leptonyx, de Blainv. sp.).
Plate 22.—The Yellow-sided Dolphin (Delphinus Novæ Zealandiæ, Quoy and Gaim.).
Plate 23.—The Common Brown Snake (Diemenia superciliosa, Fisch.).
The Small-scaled Brown Snake (Diemenia microlepidota, McCoy).
The Shield-fronted Brown Snake (Diemenia aspidorhyncha, McCoy).
Plate 24.—Catenicella margaritacea (Busk).—C. plagiostoma (Busk).—C. ventricosa (Busk).—C. hastata (Busk.)—C. rufa (McG.).—C. cribraria (Busk).—C. alata (Wyv. Thomson).—C. lorica (Busk).—C. formosa (Busk).—C. elegans (Busk).—C. perforata (Busk).—C. Buskii (Wyv. Thomson).—C. Hannafordi (McG.).—C. crystallina (Wyv. Thomson).—C. carinata (Busk).—C. aurita (Busk).—C. geminata (Wyv. Thomson).—C. cornuta (Busk).—C. intermedia (McG.)
Plate 25.—Membranipora membranacea (Linn. sp.).—M. perforata (McG.).—M. ciliata (McG.).—M. mamillaris (McG.).—M. umbonata (Busk).—M. pilosa (Linn. sp.).—M. cervicornis (Busk).
Plate 26.—Membranipora dispar (McG.).—M. Woodsii (McG.).—M. lineata (Linn. sp.).—M. Rosselii (Audouin sp.).—M. Lacroixii (Savigny sp.).
Plate 27.—The Australian Rockling (Genypterus Australis, Cast.).
The Yarra Blackfish (Gadopsis gracilis, McCoy).
Plate 28.—The Southern Mackerel (Scomber pneumatophorus, De la Roche).
Plate 29.—The Yabber Crayfish (Astacoides bicarinatus, Gray sp.).
Plate 30.—The Large Wattle Goat-Moth (Zeuzera Eucalypti, Boisd. Herr.-Schæf.).

CONTENTS OF DECADES.

DECADE IV.

Plate 31.—The Australian Sea-Bear or Fur-Seal (Euotaria cinerea, Péron sp.).
Plate 32.—The Two-hooded Furina-Snake, Furina bicucullata (McCoy).
Plate 33.—The Banded Red Gurnet-Perch (Sebastes percoides, Solander sp.).
Plate 34.—The Angel-fish (Rhina squatina, Lin. sp.).
Plate 35.—Lepralia circinata (McG.).—L. Cecilii (Aud.).—L. diaphana (McG.).—L. marsupium (McG.).—L. subimmersa (McG.).—L. anceps (McG.).—L. Maplestonei (McG.).
Plate 36.—Lepralia vittata (McG.).—Membranipora perforata. Lepralia Brogniartii (Aud.).—L. elegans (McG.).—L. pertusa (Esper. sp.).—L. Malusii (Aud. sp.).—L. lunata (McG.).
Plate 37.—Lepralia ciliata (Linn. sp.).—L. trifolium (McG.).—L. cheilodon (McG.).—L. canaliculata (McG.).—L. larvalis (McG.).—L. diadema (McG.).—L. papillifera (McG.).—L. Ellerii (McG.).
Plate 38.—Lepralia monoceros (Busk).—L. excavata (McG.).—L. vitrea (McG.).—L. megasoma (McG.).—L. Schizostoma (McG.).—L. Botryoides (McG.).—L. ferox (McG.).—L. pellucida (McG.).
Plate 39.—Crisia Edwardsiana (D'Orb. sp.).—C. biciliata (McG.).—C. acropora (Busk).—C. setosa (McG.).—C. tenuis (McG.).
Plate 40.—Saunders' Case-Moth (Metura elongata, Saunders sp.).
The Lictor Case-Moth (Entometa ignobilis, Walk.).

DECADE V.

Plate 41.—The Lace Lizard (Hydrosaurus varius, Shaw sp.).
Plate 42.—The Spotted Marsh-Frog (Limnodynastes Tasmaniensis, Günth.).—The Common Sand-Frog (Limnodynastes dorsalis, Gray).
Plate 43.—The Carpet Shark (Crossorhinus barbatus, Lin. sp.).—The Seven-gilled Shark (Notidanus [Heptanchus] Indicus, Cuv.).
Plate 44.—The Barracouta (Thersites atun, Cuv.).—The Tunny (Thynnus Thynnus, Lin. sp.).
Plate 45.—Flustra denticulata (Busk).—Carbasea episcopalis (Busk).—C. dissimilis (Busk).—C. indivisa (Busk).—C. elegans (Busk).—Ç. pisciformis (Busk).
Plate 46.—Spiralaria florea (Busk).—Diachoris Magellanica (Busk).—D. spinigera (P. McGil.).—Dimetopia spicata (Busk).—D. cornuta (Busk).—Didymia simplex (Busk).—Calwellia bicornis (Wyv. Thomson).
Plate 47.—Dictyopora cellulosa (P. McGil.).
Plate 48.—Eschara obliqua (P. McGil.).—E. dispar (P. McGil).—E. gracilis (Lamx.).—E. platalea (Busk).—E. quadrata (P. McGil.)—E. mucronata (P. McGil.).—Caleschara denticulata (P. McGil.).
Plate 49.—Cellaria fistulosa (Linn.).—C. hirsuta (P. McGil.).—C. tenuirostris (Busk.).—C. gracilis (Busk).—Nellia oculata (Busk).—Tubucellaria hirsuta (Busk).
Plate 50.—The Great Black, or Manna Cicada (Cicada mœrens, Germ.).—The Great Green Cicada (Cyclochila Australasiæ, Donov. sp.).

DECADE VI.

Plate 51.—The Victorian Rhodona (Rhodona Officeri, McCoy).
Plate 52.—The Black and White Ringed Snake (Vermicella annulata, Gray).
Plate 53.—The Green and Golden Bell-Frog (Ranoidea aurea, Less. sp.).
Plates 54–55.—The Australian Aulopus (Aulopus purpurisatus, Rich.).
Plate 56.—The Hammer-headed Shark (Zygæna malleus, Shaw).—The Common Australian Saw-Fish (Pristiophorus nudipinnis, Günth.).
Plate 57.—Biflustra perfragilis (McGil.).—B. delicatula (Busk).
Plate 58.—Cellularia cuspidata (Busk).—Menipea crystallina (Gray sp.).—M. cyathus (Wyv. Thomson).—M. cervicornis (McGil.)—M. tricellata (Busk).—M. Buskii (Wyv. Thomson).
Plate 59.—Bicellaria tuba (Busk).—B. grandis (Busk).—B. ciliata (Linn).—B. turbinata (McGil.).—Stirparia annulata (Map.).—Bugula neritina (Linn.).
Plate 60.—Steganoporella magnilabris (Busk. sp.).—Petralia undata (McGil.).

CONTENTS OF DECADES.

DECADE VII.

Plate 61.—The Tuberculated Argonaut (Argonauta oryzata, Meusch.).
Plate 62.—The same seated in its so-called shell or Paper-Nautilus.
Plate 63.—The Blue-spotted Eagle-Ray (Myliobatis Australis, Macleay).
Plate 64.—The Long-toothed Bull-Shark (Odontaspis taurus, Raf.).—The Australian Tope Shark (Galeus Australis, Macleay).
Plate 65.—The Leafy Sea-Dragon (Phyllopteryx foliatus, Shaw sp.).—The Short-headed Sea-horse (Hippocampus breviceps, Pet.)
Plate 66.—Dictyopora grisea (Lamx. sp.).—D. albida (Kirch.)—(Var. avicularis, P. McGill.).
Plate 67.—D. Wilsoni (P. McGill.).
Plate 68.—Idmonea Milneana (d'Orb.).—I. contorta (P. McGill.).—I. radians (Lamk.).
Plates 69–70.—The Violet-shouldered Phasma (Tropidoderus iodomus, McCoy).—The Red-shouldered Phasma (Tropidoderus rhodomus, McCoy).

DECADE VIII.

Plate 71.—The Australian Sea-Bear or Fur-Seal (Euotaria cinerea, Péron sp.).
Plate 72.—The Northern Blue-tongued Lizard (Cyclodus gigas, Bodd. sp.).
Plate 73.—The Ludrick (Girella simplex, Rich. sp.).
Plate 74.—The White Shark (Carcharodon Rondeletii, Müll. and Hen.).
Plate 75.—The Picked Dog-Fish (Acanthias vulgaris, Linn. sp.).
Plates 76–77.—The Australian Tooth-cupped Cuttlefish (Sepioteuthis Australis, Quoy and Gaim.).
Plate 78.—Bugula robusta (P. McGil.).—B. cucullata (Busk).—B. dentata (Lamx.).—B. avicularia (Pall.).
Plate 79.—The Violet-winged Phasma (Acrophylla violascens, Leach sp.).
Plate 80.—The Large Pink-winged Phasma (Podacanthus typhon, Gray).

CONTENTS OF DECADE IX.

N.B.—The originals of all the Figures are in the National Museum, Melbourne.

Plate 81.—The Gippsland Water Lizard (Physignathus Lesueri, Gray)—(Var. Howitti, McCoy).

Plates 82-83.—The Murray Tortoise (Chelymys Macquaria, Cuv. sp.).

Plate 84.—The Murray Golden Perch (Ctenolates ambiguus, Rich. sp.).

Plates 85-86.—The Murray Cod-Perch (Oligorus Macquariensis, Cuv. and Val. sp.).

Plate 87.—The Australian Smooth-Hound (Mustelus Antarcticus, Günth.).

Plate 88.—The Thresher, or Long-tailed Shark (Alopecias vulpes, Linn. sp.).

Plate 89.—Catenicella intermedia (P. McG.).—C. amphora (Busk).—C. Wilsoni (P. McG.).—C. pulchella (Map.).—C. utriculus (P. McG.).

Plate 90.—Catenicella fusca (P. McG.).—C. umbonata (Busk).—C. cornuta (Busk).

MARY D. ROGICK

Natural History of Victoria.

PRODROMUS

OF THE

ZOOLOGY OF VICTORIA;

OR,

FIGURES AND DESCRIPTIONS OF THE LIVING SPECIES OF ALL CLASSES

OF THE

VICTORIAN INDIGENOUS ANIMALS.

DECADE X.

BY

FREDERICK McCOY, F.R.S.,

HONORARY MEMBER OF THE CAMBRIDGE PHILOSOPHICAL SOCIETY; HONORARY ACTIVE MEMBER OF THE IMPERIAL SOCIETY
OF NATURALISTS OF MOSCOW; CORRESPONDING MEMBER OF THE ZOOLOGICAL SOCIETY OF LONDON;
HONORARY MEMBER OF THE ROYAL SOCIETY OF NEW SOUTH WALES; HONORARY FELLOW OF THE GEOLOGICAL SOCIETY
OF EDINBURGH; HONORARY MEMBER OF THE GEOLOGICAL SOCIETY OF MANCHESTER,
ETC., ETC., ETC.
AUTHOR OF "SYNOPSIS OF THE CARBONIFEROUS LIMESTONE FOSSILS OF IRELAND;" "SYNOPSIS OF THE SILURIAN FOSSILS OF
IRELAND;" "CONTRIBUTIONS TO BRITISH PALÆONTOLOGY;" ONE OF THE AUTHORS OF SEDGWICK AND McCOY'S
"BRITISH PALÆOZOIC ROCKS AND FOSSILS;" "PRODROMUS OF THE PALÆONTOLOGY OF VICTORIA," ETC.
PROFESSOR OF NATURAL SCIENCE IN THE MELBOURNE UNIVERSITY.
GOVERNMENT PALÆONTOLOGIST, AND DIRECTOR OF THE NATIONAL MUSEUM OF MELBOURNE, ETC.

MELBOURNE:
BY AUTHORITY: JOHN FERRES, GOVERNMENT PRINTER.
LONDON:
TRÜBNER AND CO., 57 AND 59 LUDGATE HILL.

M DCCC LXXXV.

Natural History of Victoria.

PRODROMUS

OF THE

ZOOLOGY OF VICTORIA;

OR,

FIGURES AND DESCRIPTIONS OF THE LIVING SPECIES OF ALL CLASSES

OF THE

VICTORIAN INDIGENOUS ANIMALS.

DECADE X.

BY

FREDERICK McCOY, F.R.S.,

HONORARY MEMBER OF THE CAMBRIDGE PHILOSOPHICAL SOCIETY; HONORARY ACTIVE MEMBER OF THE IMPERIAL SOCIETY
OF NATURALISTS OF MOSCOW; CORRESPONDING MEMBER OF THE ZOOLOGICAL SOCIETY OF LONDON;
HONORARY MEMBER OF THE ROYAL SOCIETY OF NEW SOUTH WALES; HONORARY FELLOW OF THE GEOLOGICAL SOCIETY
OF EDINBURGH; HONORARY MEMBER OF THE GEOLOGICAL SOCIETY OF MANCHESTER,
ETC., ETC., ETC.
AUTHOR OF "SYNOPSIS OF THE CARBONIFEROUS LIMESTONE FOSSILS OF IRELAND;" "SYNOPSIS OF THE SILURIAN FOSSILS OF
IRELAND;" "CONTRIBUTIONS TO BRITISH PALÆONTOLOGY;" ONE OF THE AUTHORS OF SEDGWICK AND McCOY'S
"BRITISH PALÆOZOIC ROCKS AND FOSSILS;" "PRODROMUS OF THE PALÆONTOLOGY OF VICTORIA," ETC.
PROFESSOR OF NATURAL SCIENCE IN THE MELBOURNE UNIVERSITY.
GOVERNMENT PALÆONTOLOGIST, AND DIRECTOR OF THE NATIONAL MUSEUM OF MELBOURNE, ETC.

MELBOURNE:
BY AUTHORITY: JOHN FERRES, GOVERNMENT PRINTER.
LONDON:
TRÜBNER AND CO., 57 AND 59 LUDGATE HILL.

M DCCC LXXXV.

PREFACE.

It having been considered desirable to ascertain accurately the natural productions of the Colony of Victoria, and to publish works descriptive of them, on the plan of those issued by the Governments of the different States of America, investigations were undertaken, by order of the Victorian Government, to determine the Geology, Botany, and Zoology of the Colony, to form collections illustrative of each for the public use, and to make the necessary preparations for such systematic publications on the subject as might be useful and interesting to the general public, and contribute to the advancement of science.

As the geological and botanical investigations have already approached completion, and their publication is far advanced, it has been decided now to commence the publication of the third branch completing the subject, namely, that of the Zoology or indigenous members of the different classes of the animal kingdom.

As the Fauna is not so well known as the Flora, it was a necessary preliminary to the publication to have a large number of drawings made, as opportunity arose, from the living or fresh examples of many species of reptiles, fish, and the lower animals, which lose their natural appearance shortly after death, and the true characters of many of which were consequently as yet unknown, as they had

only been described from preserved specimens. A Prodromus, or preliminary issue, in the form of Decades, or numbers of ten plates, each with its complete descriptive letterpress, will be published, of such illustrations as are ready, without systematic order or waiting for the completion of any one branch. The many good observers in the country will thus have the means of accurately identifying various natural objects, their observations on which, if recorded and sent to the National Museum, where the originals of all the figures and descriptions are preserved, will be duly acknowledged, and will materially help in the preparation of the final systematic volume to be published for each class when it approaches completion.

In the first plate (91) of this tenth Decade there is the first coloured representation of that most curious and rare Marsupial, the *Gymnobelideus Leadbeateri;* which, with the form, feet, and dentition of the beautiful Marsupial so-called Flying Squirrels of Australia, constituting the genus *Belideus*, is entirely destitute of the lateral expansion of skin forming the parachute which enables the *Belidei*, like the true Flying Squirrels of other countries, to almost fly, in their sustained jumps from one tree to another.

The second and third plates show the natural colours for the first time of a River Tortoise, the *Chelodina longicollis*, which abounds in many of the rivers of Gippsland, and more rarely in the Murray, where the *Chelymys Macquaria* (figured in our plates 82 and 83) is the common Tortoise—a species not known in the rivers flowing south into the sea.

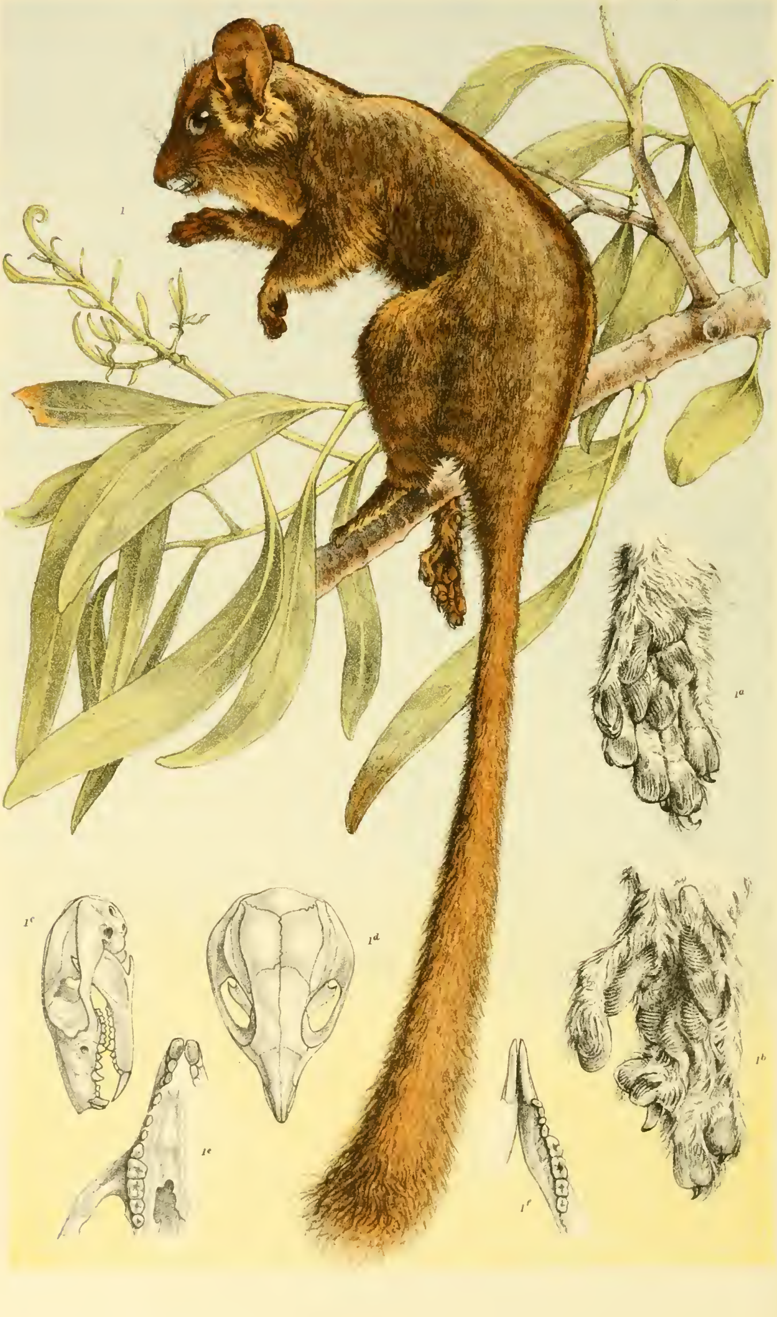
The six following plates illustrate a splendid series of Victorian species of *Retepora*, contributed by Dr. MacGillivray to the National Museum and this work.

The last plate gives full details of the fine Sea-Urchin, the *Goniocidaris tubaria*, with its extraordinary variety of spines ; all different, however, from the fossil spines of the same genus found in the Tertiary formations of our shores.

The succeeding Decades will illustrate as many different genera as possible, and will deal first usually with species of some special interest, and of which good figures do not exist, or are not easily accessible.

FREDERICK McCOY.

16th September, 1883.



J. Wild del et lith

Prof. McCoy direxit

Steam litho. Govt Printing Office

PLATE 91.

GYMNOBELIDEUS LEADBEATERI (McCOY).

[Genus GYMNOBELIDEUS (McCOY). (Sub-kingd. Vertebrata. Class Mammalia. Order Marsupialia. Fam. Phalangistidæ.)

Gen. Char.—Teeth and general form of *Belideus*, but destitute of the lateral, cloak-like parachute or flank-membrane, and having on the fore feet the inner finger or thumb shortest, the second longer, the third longer than the second, the fourth longest, the fifth (or outer) toe shorter than the third, but longer than the second. On the hind feet the inner toe or thumb is succeeded by two of nearly equal size, more slender and shorter than the others, and united together as far as the base of the last joint. The thumbs of the hind feet are without nails, and the claws of all the other toes are small, and exceeded in length by the prominent wrinkled pads on the underside. The ears are large, semielliptical, and nearly naked towards the tips. Dental formula :—incisors $\frac{3}{1}$, canines $\frac{1}{0}$, premolars $\frac{3}{4}$, molars $\frac{4}{4} = 40$. Australia.]

DESCRIPTION.—Upper surface brownish grey, with a blackish, dusky streak from the top of the head along the back to the sacrum; there is a dark patch under the base of the ear, and a fainter one before and behind the eye. Under surface dull yellowish; tail rather lighter than the back, and lightish at the tip. Head like that of *Belideus breviceps*, but with a slightly sharper snout. The tail has the fur no longer on the basal half than on the back, the apical third of the length being gradually more bushy, from the greater length of the hair. Ears brown. The fur of the body is soft and dense, the hairs grey at the base, and blackish and tipped with brownish white at the end; the fur of the tail is brownish throughout. *Teeth:* Anterior incisor above more than twice the length of the others, and rather broader near the edge than at the base; second incisor shorter than the third, which is triangular; space between third incisor and canine equal to length of second incisor; canine conical, shorter than the first, but longer than the third incisor; space between canine and next premolar one-third the width of the canine; second premolar half the length of the canine, first a little longer, both triangular and single-rooted; third premolar as long as the canine, or one-third longer than the next molar, double-rooted, and triangular. First three molars quadrate, with two blunt tubercles on outer and two on inner edge; fourth or last molar smallest, triangular, with one tubercle behind and two in front. The molars and second and third premolars are in continuous contact. *Lower jaw:* All the teeth in continuous series without interval; incisors long, nearly horizontal, sharp-pointed; first three premolars small, short, and obtuse, the antero-posterior extent of the first greatest; third least, but all of one height; fourth premolar twice the height of the others, triangular, with a slight lobe at back of base; first molar with anterior half forming a conical lobe nearly twice the height of the last premolar and of the rest of the molars; posterior half bitubercular, and only as high as the others, which are all quadritubercular, except the small hind one, which is tritubercular.

	Ins.	lines.
Length of head	1	8
„ from snout to base of tail	5	4
„ of tail	6	5
„ of ear	0	9
„ of fore foot	0	9
„ of hind foot	1	0½
„ of nasal bones	0	6½
„ of frontal bones	0	7

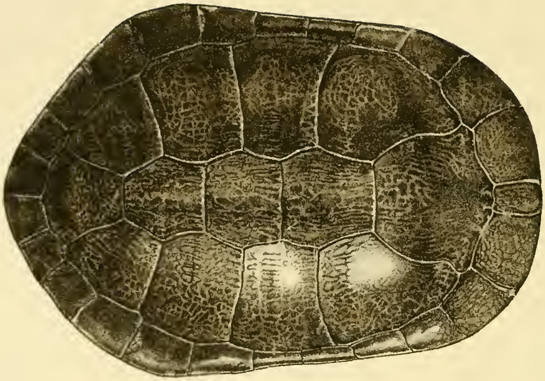
REFERENCE.—McCoy, Ann. and Mag. Nat. Hist. 1867, vol. xx. p. 287.

In general appearance this curious animal is intermediate between *Belideus* and *Phascogale;* but its nearest affinity is with the former, from which the absence of the flank-membrane and the different form of the feet distinguish it. There is only one species known, which occurs in the scrub on the banks of the Bass River, in Victoria. I name it after the skilled taxidermist of our Public Museum, in which specimens of both sexes are preserved.

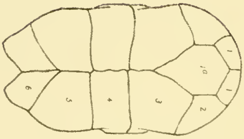
EXPLANATION OF FIGURES.

PLATE 91.—Fig. 1 represents the male, two-thirds the natural size. Figs. 1*a*, fore foot, and 1*b*, hind foot, twice the natural size. Fig. 1*c*, skull, side view, natural size. Fig. 1*d*, same, viewed from above. Fig. 1*e*, teeth of upper jaw, magnified two diameters. Fig. 1*f*, teeth of lower jaw, twice natural size.

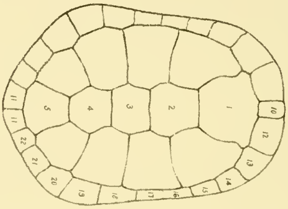
FREDERICK McCOY.



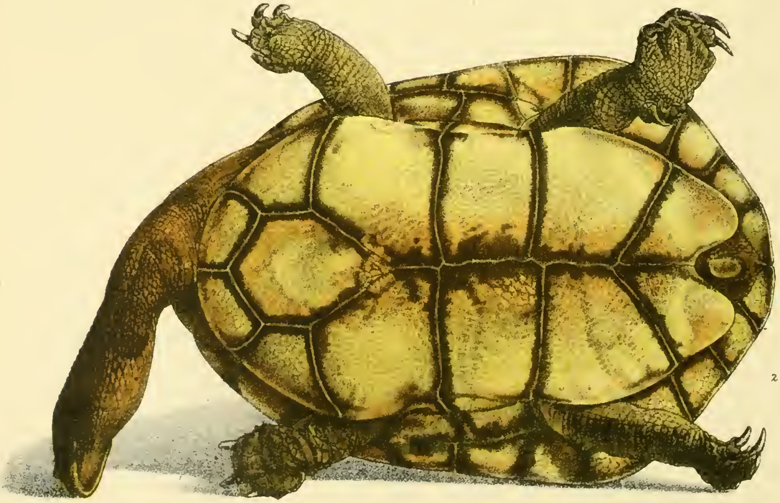
1



3



4

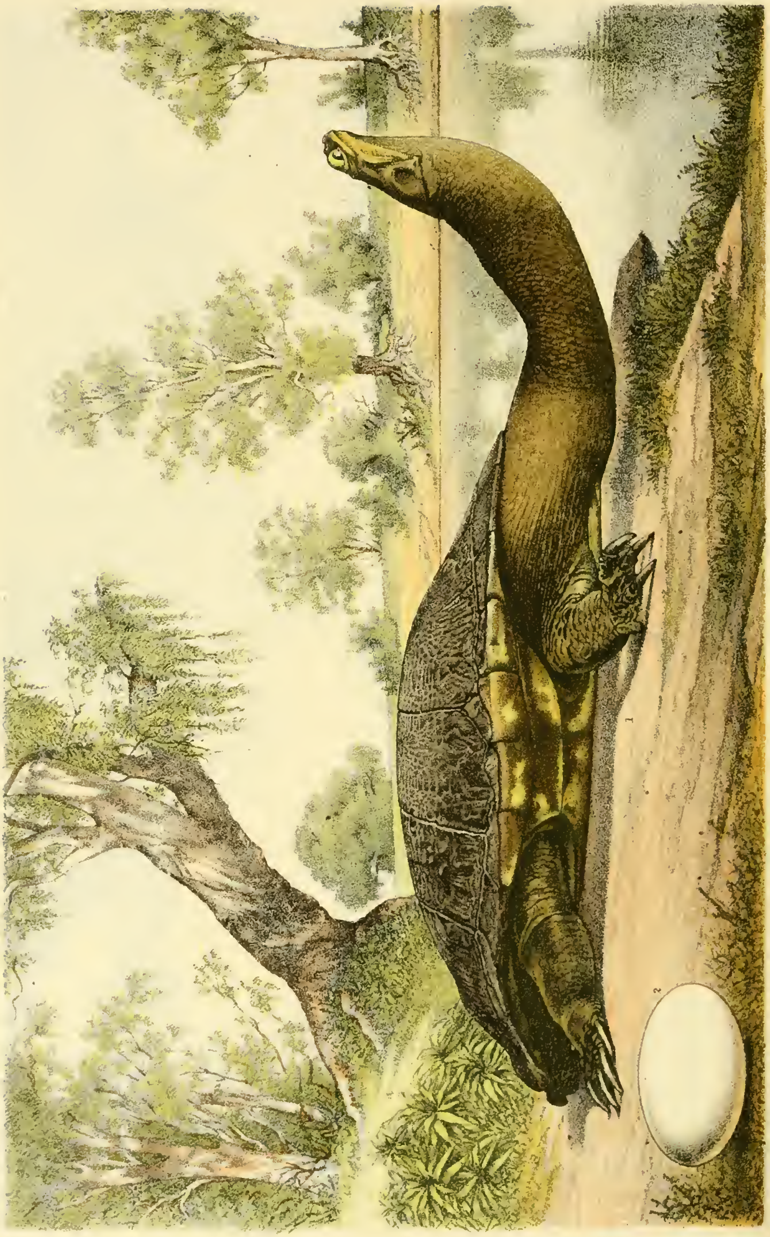


2

Dr Wild del et lith

Prof McCoy direxᵗ

Steam litho, Govt Printing Office



Dr Wild del et lith
Prof Mc Coy dirext
Steam litho Govt Printing Office

PLATES 92 AND 93.

CHELODINA LONGICOLLIS (SHAW SP.).

LONG-NECKED RIVER TORTOISE.

[Genus CHELODINA (GRAY). (Sub-kingdom Vertebrata. Class Reptilia. Section Cataphracta. Order Chelonia. Sub-order Pleuroderes. Family Chelydidæ. Sub-family Hydraspidinæ.)

Gen. Char.—Head long, flat; covered with thin skin; muzzle short; mouth wide; jaws narrow, weak, without notches; no barbels under chin. Neck very long. Plastron wide, rounded in front, solidly fixed to the carapace; sternal wings very short; 25 marginal plates to the carapace, and 13 to the plastron; a nuchal plate; intergular plate larger than the gulars. Four toes of the five claws on each foot. Tail very short. Australia.]

DESCRIPTION.—*Form:* Carapace oblong, ovate, slightly narrowed in front, obtusely angulate behind; a variable convexity with a deep wide channel along the 2nd, 3rd, and 4th vertebral plates, more marked in old specimens; nuchal plate between the margino-collar (12); the plates of the margin are less than half the width at the sides, as over the neck, limbs, and tail, and are abruptly reflected or curled upwards, so that the outer edge is nearly in contact with the inner margin; moderately arched over the thighs, and angularly elevated at inner margin of caudals; profile of back gently arched, deepest behind the middle, falling suddenly to the posterior end, more gradually towards the front. *Plates:*[*] Nuchal plate (10) large, quadrilateral, varying from one-third longer than wide to twice as long as wide, between the margino-collars (12), which are trapezoidal; margino-brachials quadrangular, a little longer than wide, the first pair (13) with the anterior margin wider than the posterior; second pair (14) with anterior margin wider than posterior; first margino-laterals (15) smaller than the posterior margino-brachial; second margino-lateral (16) rectangular; 3rd (17) and 4th (18) rhomboidal; 5th (19) oblong, wider behind than before; margino-femorals (20, 21, 22) quadrate; supracaudals (11) trapezoidal. First vertebral plate (1) octagonal, larger than the others, touching the nuchal, the margino-collar, and the first margino-brachial, posterior side concave; 2nd (2) and 3rd (3) hexagonal; 4th (4) hexagonal, anterior side wider than the posterior. The 5th vertebral plate (5) is an isoceles triangle with truncated apex, with five angles at base behind; the last costal plates (9) have nearly the same shape as the 5th vertebral, but are larger. All the plates of carapace with a few concentric lines at margin, and obtuse, irregular, nodular ridges and tubercles longitudinal on the vertebral plates, and transverse on the costal plates; plates of plastron nearly smooth, finely netted in the middle. Plastron very wide, the width varying from wider in front than behind to narrower in front than behind, some equal; rounded in front, and with a V-shaped notch behind, the angles of which are obtusely rounded; the sternal wings are about one-fourth as wide as the plastron, and about one-third its length, bent up strongly towards the carapace; intergular plate (1*a*) very large, hexagonal, the two posterior sides longest and forming an acute angle posteriorly, surrounded by the three first pairs of sternal plates (1, 2, 3); gular plates (1) four-sided, wider than long, inner side shorter than outer margin; humerals (2) trapezoidal, larger than the gulars, but half the size of the pectorals (3); pectorals pentagonal, two right angles behind, one in front; abdominal plates (4) rectangular, transversely oblong; femorals (5), trapezoidal or subtriangular with curved base and truncated apex; anals (6) rhomboidal, with two short and two longer sides. Head long, much flattened behind, obtusely pointed, rounded in front, jaws feeble with simple edges; skin of front and a large, rhomboidal space between the eyes smooth; temples and rest of head covered with small, polygonal or oval, juxtaposed scales. Neck slender, slightly depressed, covered above with convex, oval, flattened tubercles, and below with fine, longitudinal ridges on the throat, rarely tuberculated on the more posterior part of the underside; four or five scale-like, transverse, chevron-shaped folds on the front of the arm, four or five larger, triangular plates on outer side of arm, and several similar ones cross the toes; two rows (one of six, the other of three) of transverse, scale-like folds on hinder part of tarsus; webs wide to base of claws with notched edges; claws long, compressed, moderately curved; tail and posterior part of body covered with triangular, more or less flattened tubercles; tail very short, compressed, scarcely exceeding end of carapace. *Colour:* Carapace very dark brown, or blackish; sternum and lower surface of marginal plates rich yellow ochre, with dark brown borders to the sutures, varying in width, sometimes narrow, but sometimes so wide as almost to obliterate the yellow on the sternal and lower side of marginal plates; throat and underside of neck, arms, and thighs whitish; head and upper surface of limbs and rest of body blackish grey; lower jaw bright yellow; iris yellowish white.

---

[*] The numbers designating the individual plates will be found on a diagram in our plate of *Chelemys Macquaria*, Plate 83.

MEASUREMENTS.

—	Female, from junction of Murray and Darling.		Specimen from 12 miles from Maffra, Upper Gippsland.		Female with large ovary, June 1883.		Male, from Gippsland, June 1883.		Young male, from Gippsland, 11th June 1883.	
	Ins.	lines.	Ins.	lines.	Ins.	lines.	Ins.	lines.	Ins.	lines.
Length of carapace	8	6	9	0	7	0	7	3	5	6
Greatest width at last margino-lateral plate (19)	6	5	6	3	4	10	4	10	4	1
Depth from middle of sternum to middle of carapace	2	9	2	10	2	3	2	3	1	11
Length of nuchal plate (10)	1	0	0	11	0	8	0	8	0	7
Width in front	0	7	0	5½	0	5	0	5	0	5½
Outer margin of—										
1st marginal plate—anterior or margino-collar plate (12) ...	1	4½	1	3½	1	1	1	1	0	8
2nd „ „ margino-brachial (13)	1	1	1	1	0	11	0	11	0	9
3rd „ „ margino-brachial (14)	0	9	0	10	0	8	0	9	0	8
4th „ „ margino-lateral (15)	0	10	1	1	0	9	0	10	0	8
5th „ „ margino-lateral (16)	0	11½	1	0	0	8½	0	9	0	5
6th „ „ margino-lateral (17)	0	10½	0	11½	0	8	0	8	0	6
7th „ „ margino-lateral (18)	1	1	1	2	0	7	0	10	0	8
8th „ „ margino-lateral (19)	1	2	1	1	1	0	0	10½	0	8
9th „ „ margino-femoral (20)	1	0	0	11	0	9	0	10	0	8
10th „ „ margino-femoral (21)	0	11	0	11	0	9	0	9	0	8
11th „ „ margino-femoral (22)	0	8	0	8	0	8	0	8	0	6
Outer margin of each caudal plate (11) ...	0	9	0	11	0	9	0	10	0	6½
Length of 1st vertebral plate (1)	1	8	2	0	1	8	1	8	1	2
Greatest width at front	2	4	2	7	2	1	2	0	1	6
Width behind	0	11	1	1	0	11	0	11	0	10
Length of 2nd vertebral plate (2)	1	5	1	6	1	1	1	2	0	11
Greatest width a little behind middle ...	1	4	1	7	1	5	1	4	1	0
Length of 3rd vertebral plate (3)	1	3	1	4	0	10½	1	1½	0	10
Greatest width at middle	1	3	1	3	1	1	1	2	0	11
Length of 4th vertebral plate (4)	1	3	1	3	1	3 *	1	1	0	7
Greatest width about middle	1	1	1	2	0	11	0	10	0	9

* Divided into two.

MEASUREMENTS—*continued.*

—	Female, from junction of Murray and Darling.		Specimen from 12 miles from Maffra, Upper Gippsland.		Female with large ovary, June 1883.		Male, from Gippsland, June 1883.		Young male, from Gippsland, 11th June 1883.	
	Ins.	lines.	Ins.	lines.	Ins.	lines.	Ins.	lines.	Ins.	lines.
Length of 5th vertebral plate (5)	1	7	1	9	1	3	1	5	1	3
Greatest width behind	1	11	1	8	1	7	1	7	1	2
Width at front margin	0	6	0	8	0	6	0	5	0	6
Length of neck from front edge of carapace to occiput	3	5	3	6	3	5	3	7	2	4
Diameter at middle	0	11	1	0	1	0	0	11	0	10
Length of head	1	6	1	9	1	6	1	5	1	4
Greatest width at hind margin of ear ...	1	1	1	3	1	1	1	0	0	10½
Greatest width	0	7	0	9	0	9	0	8	0	8½
Diameter of ear	0	4½	0	5	0	4	0	3½	0	3
Length of anterior limb, about	2	7	3	0	2	6	2	4	2	0
,, ,, longest toe, without claw	0	6	0	5	0	4	0	5	0	5
,, ,, claw	0	5	0	6	0	3	0	3	0	3
,, ,, posterior limb, about	3	6	3	8	3	0	2	8	2	0
,, ,, longest toe, without claw	0	9	0	6	0	5	0	5	0	4
,, ,, claw	0	5½	0	7	0	5	0	3½	0	4
,, ,, tail, about	0	9	0	6	0	6	0	8	0	7
,,. ,, intergular plate	2	2	2	2	2	0	1	11	1	7½
Greatest width	1	8	2	0	1	7	1	5	1	0½
Width of gular plates (1) at outer margin, each	1	2	1	2	1	0	0	11	0	9
Outer margin of humeral plate (2)	1	10	2	1	1	4	1	7	1	2½
Length of anal plates (6) at outer margin ...	1	3	1	3	1	0	0	10	0	9
Width of plastron across ends of caudal plates	2	11	1	6	1	2	1	1	1	0
,, across middle of femoral plates (5) ...	4	2	4	5	3	5	3	2	2	9
,, of plastron across ends of posterior outer angles of humeral plates (2) ...	4	3	4	7	3	5	3	6	2	11
Number of tubercles in 1 inch along middle of back of neck, about	Seven		Ten		Seven		Nine		Sixteen	

REFERENCE.—*Testudo longicollis*, Shaw, Gen. Zool. v. 3, t. 6 ; = *Chelodina Novæ-Hollandiæ*, Dum. & Bib. Erp. v. 2, p. 443, t. 21, p. 2.

This handsome Tortoise is as common in the rivers of Southern Gippsland as the *Chelemys Macquaria* is in the Murray and its tributaries ; and although it also inhabits the more northern Australian rivers, the *Chelemys* has not yet been found in those flowing south. Although the yellow upturned sides of the carapace are usually marked with square brown patches on the edges of the plates, and those below have usually broad brown edges, some rare examples have the brown so extended as almost to obliterate the usual, yellow ground colour. The detailed measurements I have given show how the individual plates, as well as the general outline of carapace and plastron, vary ; in none of my specimens do the anterior edges of the 2nd and 11th marginal plates coincide with sutures of the costal plates, as mentioned in

Dr. Gray's examples. There are certainly no barbels under the chin of this tortoise.

The small young agree with the large adults in all respects of dorsal sulcus, rugosity of carapace, shape and colour, the only difference being the less reflexion of the middle lateral edges of the carapace. The only specimen I have of the *C. sulcifera* is from the Goulburn, and is about the same size as the smallest above measured, but has a very much wider carapace in proportion to its length (*C. longicollis* $\frac{51}{100}$, *C. sulcifera* $\frac{64}{100}$), and it has no dorsal sulcus, has radiating ridges on the plates of the carapace, and concentric lines forming a broad margin round the sutures; the colouring is the same in both; and whether they are distinct species or varieties I am unable to satisfy myself without examining more specimens of the *C. sulcifera*.

Explanation of Figures.

Plate 92.—Fig. 1, dorsal view of carapace, to show markings and dorsal sulcus. Fig. 2, underside of another specimen in the attitude it assumes when turning from its back to the ordinary position, which it effects by pressing its beak against the ground. Fig. 3, diagram of plates of the plastron. Fig. 4, diagram of plates of carapace. These plates are numbered to agree with the description.

Plate 93.—Fig. 1, average specimen, half natural size. Fig. 2, egg, natural size.

Frederick McCoy.

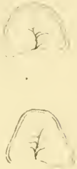
94

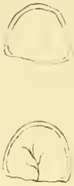
[illegible]

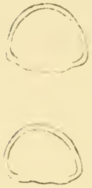
Pl. 94

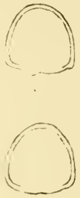
ZOOLOGY OF VICTORIA

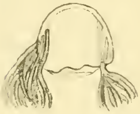
(Polyzoa)

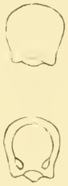

1

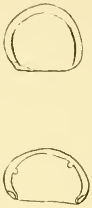

2

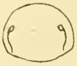

3

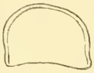

4

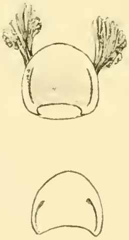

5

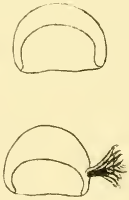

6

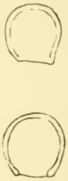

7

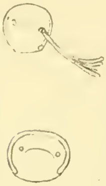

8

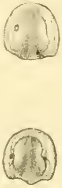

9

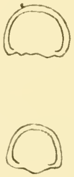

10

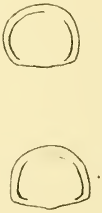

11


12


13


14


15


16

0 01 Inch

P. E. McC. del. J. R. lith.   Prof. McCoy direxᵗ   Steam litho Govt. Printing Office

PLATE 94.

OPERCULA OF SPECIES OF RETEPORA.

Fig. 1, R. MONILIFERA.

2, R. MONILIFERA, VAR. SINUATA.

3, R. MONILIFERA, FORM MUNITA, VAR. LUNATA.

4, R. MONILIFERA, FORM MUNITA, VAR. ACUTIROSTRIS.

5, R. MONILIFERA, FORM UMBONATA.

6, R. FORMOSA.

7, R. AURANTIACA.

8, R. PORCELLANA.

9, R. PORCELLANA, VAR. LAXA.

10, R. CARINATA.

11, R. GRANULATA.

12, R. SERRATA.

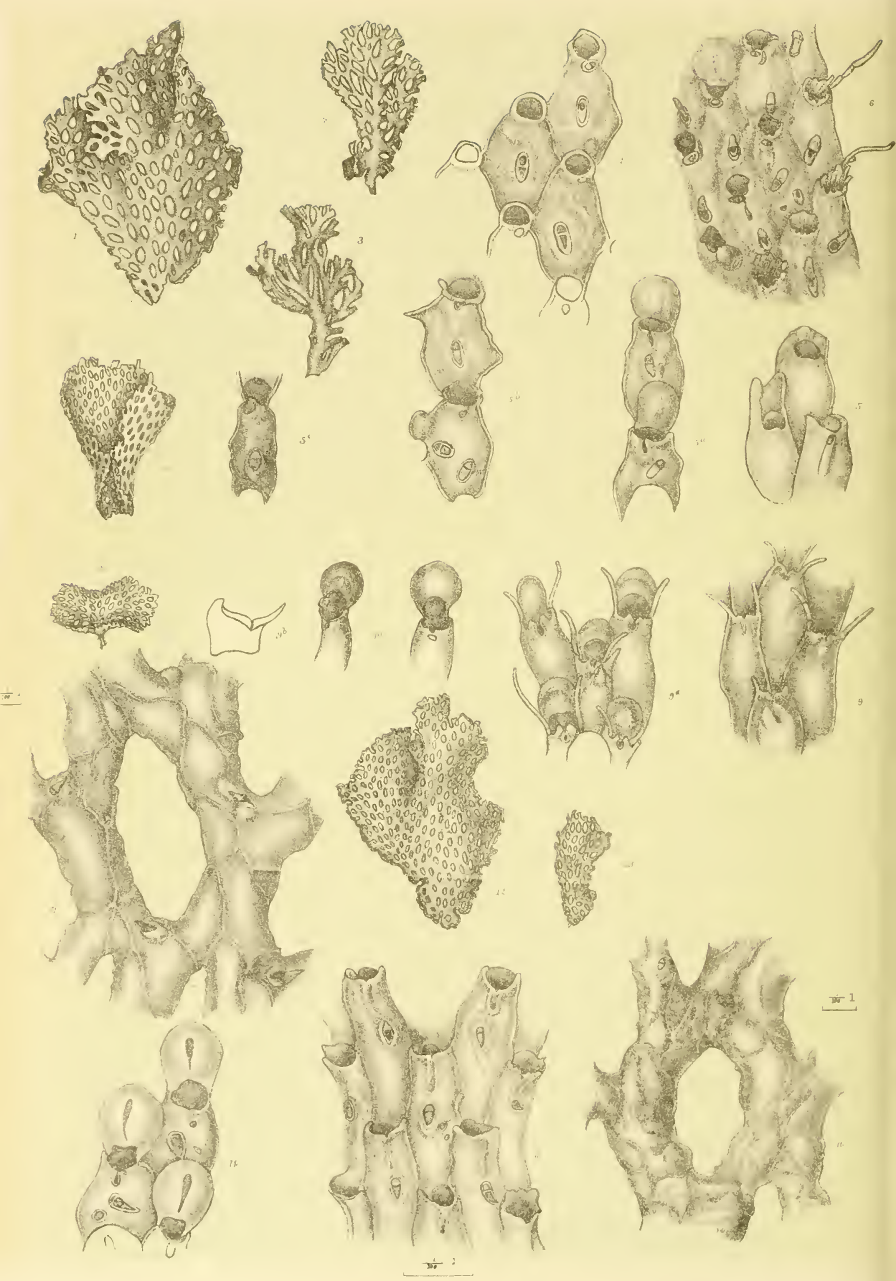
13, R. PHŒNICEA.

14, R. TESSELLATA.

15, R. FISSA.

16, R. AVICULARIS.

Polyzoa



[illegible] & [illegible] lith.

PLATE 95, FIGS. 1–6.

RETEPORA PORCELLANA (P. McG.).

DESCRIPTION.—Polyzoary massive, expanded, convoluted, or calyculate; fenestræ elongated; cells rhomboidal, separated by distinct raised lines, terminating superiorly opposite the lower part of the mouth; mouth arched above, straight or slightly hollowed below; lower lip entire, with (usually) an avicularium below it; a spine articulated on each side; operculum rounded, wider than high; an elliptical avicularium on the front of the cell, with a spatulate or linguiform mandible directed vertically or obliquely downwards; ovicell rounded, smooth, or with a few ridges, much immersed, when young with a broad, short, vertical opening, which, as growth advances, becomes filled in, and in some cases forms a slightly prominent ridge; dorsal surface obscurely granular or slightly areolated, traversed by numerous raised lines, and usually with one or more small oval avicularia on each part defined by those vibices.

REFERENCES.—P. H. MacGillivray, Tr. Roy. Soc. Vict., 1869 and 1882; *R. robusta*, Hincks, Ann. and Mag. Nat. Hist., May 1878.

Port Phillip Heads.

Varies a good deal in appearance, according to age, old specimens being very massive, the fenestræ shorter and interspaces thicker than in younger individuals. The form of the lower lip varies. It is usually straight and entire, with a rounded avicularium immediately below. Sometimes there is a slight fissure in place of the avicularium, and occasionally there is a fissure towards one side, and on the wider part of the lip an avicularium. In young marginal cells there is no appearance of any sinus. Frequently the central part of the cell is depressed. A variety occurs which I have named *laxa*, presenting so marked a difference in its appearance that I was inclined to consider it as a distinct species. In it the fenestræ are very long, and are formed by the irregular division and anastomosis of broad branches from a main stem. The cells are usually longer, the separating raised margins not so prominent, and many of the oral spines, of which in the marginal cells there are frequently four or five, are very long and jointed, as in *R. monilifera*, but much more slender. An old dead specimen of this variety has a very peculiar appearance, being divided into regular longitudinal ridges, the intervening hollows formed by the mouths and depressed centres of the cells.

EXPLANATION OF FIGURES.

PLATE 95.—Figs. 1 and 2, specimens, natural size. Fig. 3, specimen of var. *laxa*, natural size. Fig. 4, small portion of fig. 1, magnified. Fig. 5, young marginal cells from another specimen. Figs. 5*a*, 5*b*, 5*c*, other cells from same specimen. Fig. 6, cells from var. *laxa*, fig. 3, magnified.

PLATE 95, FIGS. 7–11.

RETEPORA AVICULARIS (P. McG.).

DESCRIPTION. — Polyzoary expanded, convoluted; fenestræ elongated, wider than the interspaces; cells elongated, separated by distinct margins; mouth arched above; lower lip with a central loop-shaped mark, frequently perforated below, on each side of which is a triangular projection pointing upwards; a long spine articulated on each side of the mouth; operculum rounded; numerous large avicularia, the rostrum elevated and with strong curved beak, the mandible triangular and pointed; ovicell rounded, prominent, smooth, and entire; dorsal surface smooth, vibicate, with scattered avicularia, with triangular mandibles.

REFERENCE.—P. H. MacGillivray, Tr. Roy. Soc. Vict., 1882.

Port Phillip Heads.

This elegant species attains a size of only about an inch high. It is very light and fragile. The lower lip with its two small triangular denticles, and the loop-shaped mark extending downwards from between them, is very characteristic. This structure, with the rounded, entire, smooth ovicell, sufficiently distinguishes it from our other species.

EXPLANATION OF FIGURES.

PLATE 95.—Figs. 7 and 8, specimens, natural size. Figs. 9 and 9*a*, portions of another specimen, magnified. Fig 9*b*, outline of avicularium. Fig. 10, a single cell and ovicell. Fig. 11, dorsal surface, half as much magnified.

PLATE 95, FIGS. 12–16.

RETEPORA FISSA (P. McG.).

DESCRIPTION.—Polyzoary expanded, waved, or slightly convoluted; fenestræ oval; cells rhomboidal or elongated, separated by raised lines; mouth rounded above, lower lip hollowed, entire, or with a slight sinus and loop-shaped mark or groove about the centre; operculum rounded, broader than high; an avicularium near the middle of the cell, with the triangular mandible directed downwards, or downwards and outwards; ovicell large, rounded, prominent, with a vertical fissure, wider above, closed below; posterior surface with numerous slightly prominent vibices and a few small avicularia.

REFERENCE.—P. H. MacGillivray, Tr. Roy. Soc. Vict., 1869, 1882, and 1883; *R. marsupiata ?,* Smith, Floridan Bryozoa.

This species, which is probably not uncommon, varies considerably. In young specimens the interspaces are slender, with from 1 to 3 or 4 rows of cells; the fenestræ being large and wide, giving to the whole a more open appearance. Older specimens are much more calcareous, the fenestræ comparatively smaller, and the polyzoary altogether more massive. In the most developed specimens the mouth has the lower lip nearly straight or hollowed, entire, or with an obscure sinus from which extends downwards a short groove. In more slender specimens the cells are longer and narrower; the upper part of the cell is curved forwards, the mouth nearly circular, and opening upwards. From the centre of the lower lip a shallow groove, with slightly raised edges, extends vertically downwards; immediately below this, or slightly to one side, is usually an avicularium, with a bluntly triangular mandible directed downwards and tilted somewhat forwards. The lower lip on either side of the groove is smooth or sometimes serrated. The edges of the groove occasionally meet to form a tube extending its whole length, or confined to the lower end. The avicularium on the front of the cell is frequently situated on an elevation which is sometimes of enormous size; the mandible is then much larger and more acutely pointed. Sometimes there are more than one avicularium on a cell.

The characteristic features are the loop-shaped mark or groove from the lower lip, the avicularium on the middle of the cell, and the permanent slit on the oicell.

It is allied to the European *R. cellulosa*, which does not occur in my collection. The specimens referred to that species by Busk, Hincks, and others, probably belong to the present. I think also that Smith's Floridan *R. marsupiata* is identical with the more slender form of our species.

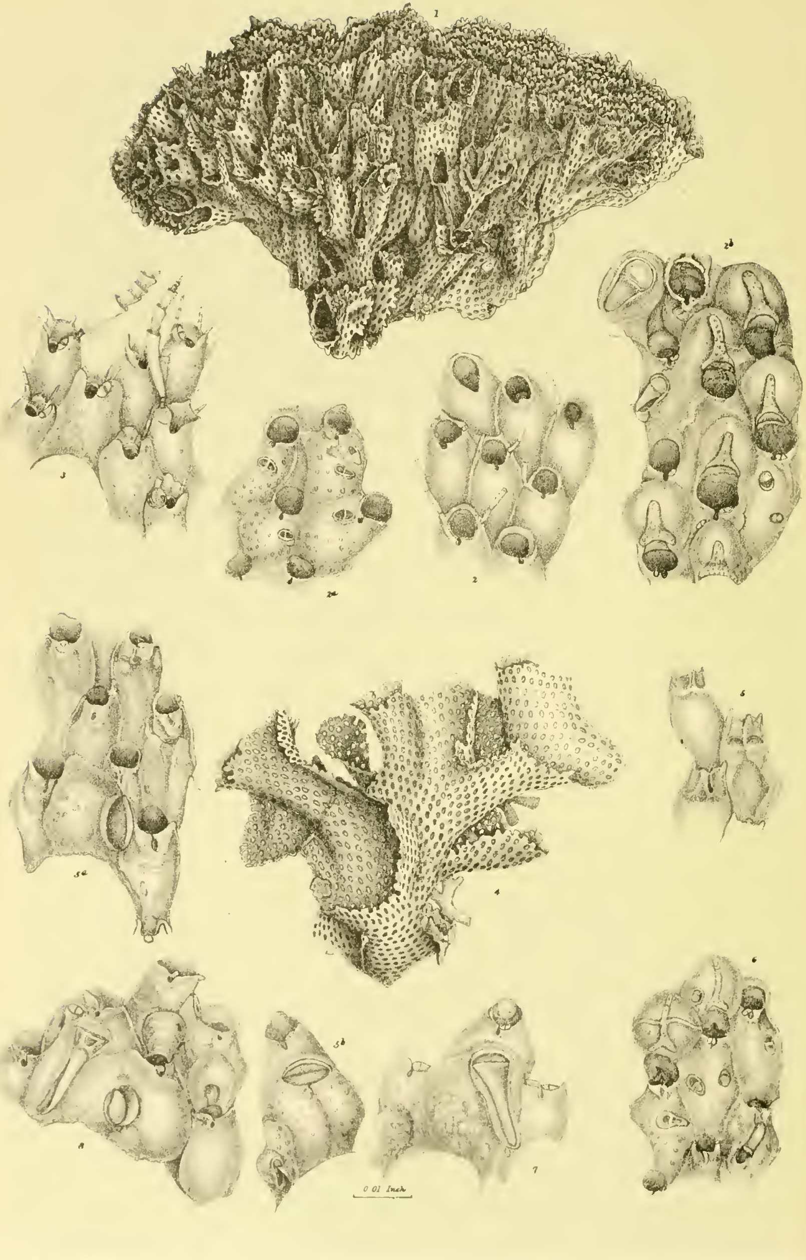
EXPLANATION OF FIGURES.

PLATE 95.—Figs. 12 and 13, specimens, natural size. Fig. 14, portion of fig. 12, magnified. Fig. 15, portion of the more slender form (= *marsupiata*, Sm. ?), magnified. Fig. 16, dorsal surface of another specimen of var. *marsupiata*, half as much magnified.

96

Cetaform

(Polyzoa)



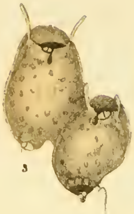
P H McG[illegible] del J Ripper lith
Prof McCoy direx^t
Steam litho Gov^t Printing Office

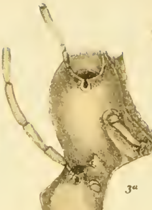
97-

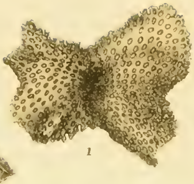
[illegible]

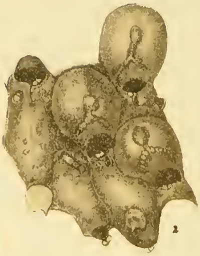
ZOOLOGY OF VICTORIA

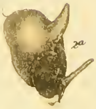
(Polyzoa)

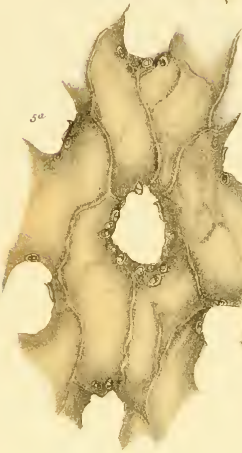

3

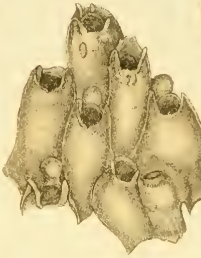

3a

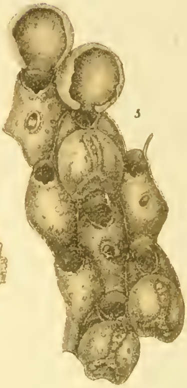

1

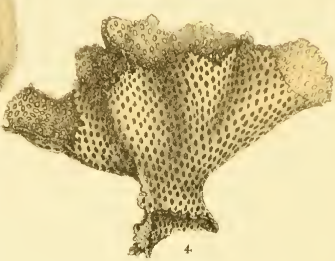

2

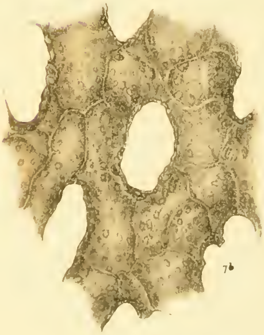

2a

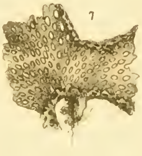

5a

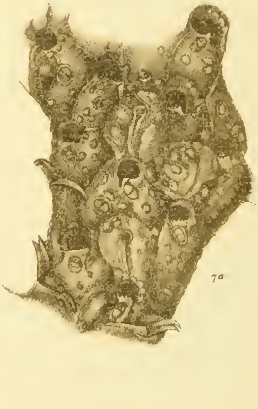

6


5


4


7b


7


7a

[illegible] Inch

P H McG. & J R del. / Ripper lith

Prof. McCoy direxᵗ

Steam litho. Govt. Printing Office

PLATES 96–7.

RETEPORA MONILIFERA (P. McGIL.).

[Genus RETEPORA (IMPERATO). (Sub-kingd. Mollusca. Class Polyzoa. Order Infundibulata. Sub-order Cheilostomata. Fam. Escharidæ.)

Gen. Char.—Polyzoary stony, reticulated. Cells opening on one surface only, immersed, indistinct posteriorly. Posterior surfaces vibicate.]

DESCRIPTION. — Polyzoary foliaceous, variously convoluted; fenestræ oval, narrower than the interspaces; cells separated by narrow, raised lines, convex, smooth or granular; primary orifice arched above, straight below, or hollowed, or with a minute sinus; secondary orifice with a sinus in the lower lip, permanently open, or becoming closed, at one side of which is generally a small oval avicularium; operculum arched above, straight below; usually an elliptical avicularium on the front of the cell, and others of various forms on different parts of the polyzoary; ovicells prominent, rounded, or pyriform, with a beaded or granular band above the orifice from which extends upwards a similar vertical band; dorsal surface vibicate, granular.

REFERENCES.—MacGillivray, Tr. Roy. Soc. Vict. 1859 and 1883; Hincks, Ann. and Mag. Nat. Hist., May 1878.

This abundant species presents several forms so marked that it may be doubtful whether they ought not to be considered as species. In all, however, the mouth has essentially the same structure, a fissure in the lower lip of the peristome with a small avicularium at one angle of the opening. This fissure is sometimes closed by the complete or partial coalescence of the opposite sides leaving only a loop-shaped mark, or the lower end remaining perforated by a round foramen. The angle supporting the oral avicularium is frequently much produced forwards. The other avicularia are extremely various. There is generally an elliptical one on the front of the cell, and forms with semilunar mandibles are common. On the inner edge of many of the fenestræ one or more are found with long narrow mandibles closing in a rostrum which has a sharp tooth on each side towards the point. These open horizontally inwards. In all, the ovicell is prominent and marked by a beaded line immediately above the orifice from the middle of which a branch extends vertically upwards. In *sinuata* the upper part of the vertical line frequently projects considerably forwards, in *munita* it occasionally ends in a sharp spine, while in *umbonata* it ends at the base of a large sharp umbo. All intermediate forms may be observed. The general form of the operculum is similar, although somewhat modified in the different forms. In the typical form it is thinner, and constantly presents a peculiar dendroid marking, which also occasionally occurs in *sinuata*, but not in the others. The peculiar large, jointed spines seem to be confined to the typical form (including var. *sinuata*) and *umbonata;* at least I have not seen them in the *munita* form.

The different varieties may be all grouped under three Forms or Sub-species :—

FORM MONILIFERA (P. McG.).

PLATE 96, FIG. 1–3.

DESCRIPTION.—Polyzoary expanded, foliaceous, closely plicated, usually much broader than high; fenestræ rounded or elliptical, much narrower than the interspaces; mouth at first with the lower margin entire or with a slight notch ; as growth advances, the peristome of the lower lip is much produced, retaining a narrow notch, at one angle of which a small avicularium is situated; ovicells prominent, the beaded line broad, the extension upwards slightly clavate, and extending nearly to the upper edge.

Port Phillip Heads ; Portland, Mr. Maplestone ; Warrnambool, Mr. Watts.

This common form is confined to shallow water. On the framework of the wooden pier at Queenscliff it forms large masses, almost dry at low tide. The mode of growth is characteristic. The polyzoary is closely plicated, forming numerous, narrow calycles and cavities, expanding widely from its attachment and, sometimes, either from a single zoarium or the confluence of several, forming masses 6–9 inches wide and 2–4 or 5 high. In the youngest marginal cells the shape of the mouth varies, the lower edge being straight, hollowed, with a small central sinus, or with a deep lateral one. As growth advances a narrow central sinus is formed in the peristome. On one angle of this a small avicularium is usually developed. Occasionally this angle is much produced forwards, bearing the avicularium on its summit. Sometimes the angles of the sinus coalesce, leaving a rounded foramen, and occasionally this also is obliterated. There is usually an elliptical avicularium on the front of the cell, towards the upper part, either vertical or oblique, sometimes nearly central, but oftener to one side. In some specimens numerous other avicularia are found, often on calcareous elevations. The mandibles are of various forms, pointed, spatulate, or semilunar, one of the last frequently situated above a fenestra. The beaded line of the ovicell is thick, the vertical part extending to its summit, where its clavate extremity is occasionally slightly elevated. Small oval or elliptical avicularia are scattered irregularly over the back, sometimes with triangular mandibles, and occasionally one of the latter of a larger size is found at the base of a fenestra.

In young cells there are frequently two long, hollow, jointed spines attached at the upper margin of the mouth. In older cells, and occasionally in younger ones, there is an enormous spine on one side articulated to an elevation of the peristome. These spines are of peculiar structure (first pointed out by Hincks), consisting of segments narrower at the base, expanding upwards, and each segment fitting into the one below, somewhat like the joints of an Equisetum.

A marked variety, which I have named *sinuata*, is usually found surrounding the stems of black algæ, and attains a size of about 2 inches by 1 to 1½. In this the polyzoary is much thicker and denser. The sinus in the lower lip is much wider and deeper, and the oral avicularium is larger. The jointed spines, which are commonly present, are of great size; the first joint is very long, the succeeding ones much shorter. The ovicells are broader, and the vertical beaded line is frequently elevated towards its upper extremity. The avicularia are usually very numerous, and are frequently raised on calcareous eminences. They vary much in shape, and the mandibles are often broadly spatulate. The back is densely granular, the vibices little prominent, and the avicularia very few.

FORM MUNITA (HINCKS).

PLATE 96, FIGS. 4–8.

DESCRIPTION.—Polyzoary expanded, foliaceous, convoluted to form large cavernous or calyculate masses; cells separated by narrow raised lines, surface granular; peristome expanded forwards, with a loop-shaped mark in the centre of the lower lip, closed or perforated below, on one side of which is an avicularium. Small oval avicularia on the front of the cells, and various others scattered in different parts. A very large avicularium, with either a semilunar or a very long, triangular, pointed mandible, above the upper angle of each fenestra; ovicells with the beaded line narrow; posterior surface granular; vibices well marked; elliptical avicularia more abundant about the edges of the fenestræ.

The largest specimen I have measures 2½ by 3 inches; but as all my others are incomplete, it probably attains a considerably greater size. The convolutions of the polyzoary form large cavities, and are not closely plicated as in the form *monilifera*. The peristome is usually much elevated forwards, with a loop-shaped mark, or occasionally a fissure, on one angle of which is a small avicularium. This avicularium is frequently, however, absent. It is also sometimes very much elevated on a production of the peristome. There is occasionally a thin spine at each side of the mouth above, but I have never seen the large jointed spines found in the other forms.

Two varieties are distinguishable. In the one, *lunata*, the supra-fenestral avicularium has the mandible semilunar and very large, and the loop of the peristome is usually imperforate. In the other, *acutirostris*, which is also usually altogether stouter, the same avicularium has an enormous, pointed mandible; and the peristome is occasionally perforated. Occasionally both forms of large avicularia occur on the same specimen.

FORM UMBONATA (P. McG.).

PLATE 97, FIGS. 1–3.

DESCRIPTION.—Polyzoary foliaceous, expanded, or convoluted; fenestræ elliptical, narrower than the interspaces; cells quadrate or ovate, separated by much raised margins; surface granular, glassy; mouth sloping obliquely backwards; in young cells lower lip nearly straight or hollowed, entire, thin; in older with a loop-shaped notch, at one angle of which is an avicularium; this notch frequently bridged over, leaving a small foramen, also sometimes obliterated, in the latter case the lip being thickened, and at its junction with the lateral margins projecting slightly, giving origin to slender, jointed spines; in many of the older cells these spines are very thick and telescopic in appearance, and frequently confined to one side; avicularia very varied, frequently a semilunar one above a fenestra, and also often one with a long, narrow mandible closing in a bidentate rostrum, opening horizontally inwards on the edge of a fenestra; ovicell prominent, the vertical band ending in the base of a sharp, smooth, umbonate process; posterior surface strongly vibicate, with numerous, small, round avicularia, especially about the edges of the fenestræ.

Port Phillip Heads, 15 fathoms.

This form, which is of comparatively small size, is distinguished by the much-raised margins of the cells and the peculiar umbonate process on the ovicell. These characters are usually so marked that it might seem necessary to constitute a distinct species. In some cases, however, the umbonate process scarcely exists, and the vertical band is little more raised than in *sinuata*. Young cells of *munita* also frequently have the margins much raised.

EXPLANATION OF FIGURES.

PLATE 96.—Fig. 1, specimen *R. monilifera*, normal form, natural size. Fig. 2, young marginal cells, from a similar specimen, magnified. Fig. 2*a*, other cells from the same specimen. Fig. 2*b*, older portion, showing ovicells and avicularia. Fig. 3, portion of var. *sinuata*, showing large sinus, oral avicularia, and spines. Fig. 4, specimen of *R. monilifera*, form *munita*, natural size. Fig. 5, young cells of var. *lunata*. Fig. 5*a*, another portion of the same specimen, showing a large avicularium. Fig. 5*b*, single cell and avicularium of same specimen. Fig. 6, small portion of another specimen, showing ovicells. Fig. 7, small portion of var. *acutirostris*, to show large avicularium and structure of the mouth. Fig. 8, small portion of another specimen, showing both semicircular and long-pointed avicularia.

PLATE 97.—Fig. 1, specimen of *R. monilifera*, form *umbonata*, natural size. Fig. 2, small portion, magnified. Fig. 2*a*, ovicell, partly in profile, to show prominence of umbo. Fig. 3, young cells. Fig. 3*a*, two cells of same specimen, showing the long, jointed spines.

PLATE 97, FIGS. 4–6.

RETEPORA FORMOSA (P. McG.).

DESCRIPTION.—Polyzoary expanded, foliaceous, convoluted so as to form large funnel-shaped compartments; fenestræ rounded or oval, narrower than the interspaces; cells elongated, expanded above, separated by distinct raised lines; surface minutely granular; mouth sloping backwards, narrowed below, the thickened lateral margin uniting at an acute angle with the raised cell-margin; the lower lip straight, with a minute sinus; operculum higher than broad, slightly contracted below; usually an elliptical avicularium on the front of the cell; ovicell large, prominent, with a small beaded band on each side above the aperture meeting at an angle in the middle, and extending vertically upwards to end in a slightly clavate extremity; dorsal surface strongly vibicate, granular, and with numerous elliptical or rounded avicularia close to the edges of the fenestræ.

REFERENCE.—P. H. MacGillivray, Tr. Roy. Soc. Vict., 1883.

Port Phillip Heads, 10–18 fathoms.

This beautiful species in appearance and size precisely resembles the *munita* form of *R. monilifera.* It is, however, at once distinguished by the form of the mouth, which slopes backwards and is wide above and contracted below. The lower lip is straight, and has usually a minute rounded sinus, and is destitute of oral avicularium. The slightly thickened sides of the mouth unite at an acute angle with the elevated margins of the cells. The operculum is also of a very characteristic shape, in correspondence with the form of the mouth. Besides the avicularium on the front of the cells and those on the back of the polyzoary, there is frequently one with a long pointed mandible opening horizontally inwards on the edge of the fenestræ. An avicularium with a semilunar mandible is also occasionally found above a fenestra in front.

EXPLANATION OF FIGURES.

PLATE 97.—Fig. 4, specimen, natural size. Fig. 5, portion of a specimen, showing the ovicells. Fig. 5*a*, dorsal surface, half as much magnified. Fig. 6, small portion of another specimen.

PLATE 97, FIG. 7.

RETEPORA CARINATA (P. McG.).

DESCRIPTION.—Polyzoary expanded; fenestræ elongated, narrower than the interspaces; cells ovate, broad, separated by narrow raised margins; mouth (primary) with the lower lip entire, or (secondary) with a deep sinus at one side and a large avicularium towards the base of the prominent peristome; operculum rounded above, hollowed below, broader than high; on the inner margin of the fenestræ several avicularia with long, pointed mandibles directed vertically from before backwards; ovicell subimmersed, pyriform, with a vertical, sharp ridge slightly bulbous at its upper extremity; dorsal surface granular, traversed by slightly raised vibices, and with a few rounded avicularia about the edges of the fenestræ.

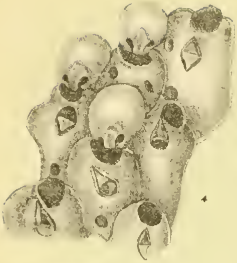
REFERENCE.—P. H. MacGillivray, Tr. Roy. Soc. Vict., 1883.

The only specimen I have seen of this very distinct species was dredged at Port Phillip Heads. It is perfect, and forms a waved, somewhat fan-shaped expansion, $\frac{7}{8}$ths of an inch wide by about $\frac{3}{4}$ths deep. The cells are mostly broad, prominent, tubercular, and glistening. The mouth is broad, arched above, and in the youngest seems to be entire and straight below or slightly convex. The peristome is rapidly developed on the lower lip, projecting as a plate with a deep notch at the angle of the mouth on one side, and receding gradually from this to nearly the level of the opposite angle, but without any notch on that side. The margin is frequently finely serrated. There is a considerable prominent avicularium below the lower lip, with the broad mandible directed upwards, usually inclined to the angle formed by the sinus. There are also other round or elliptical avicularia scattered in various parts, and numerous avicularia with long narrow mandibles, closing in bidentate rostra, close to the edges of the fenestræ. Similar avicularia occur in some other species; but in these, so far as I have seen, they always open horizontally inwards, while in the present they are directed across the edge of the fenestræ. The vertical slit, the closure of which gives rise to the vertical ridge on the ovicell, is still in some instances slightly open towards the upper extremity.

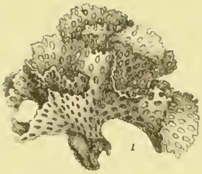
EXPLANATION OF FIGURES.

PLATE 97.—Fig. 7, specimen, natural size. Fig. 7*a*, portion magnified. Fig. 7*b*, portion of dorsal surface, half as much enlarged.

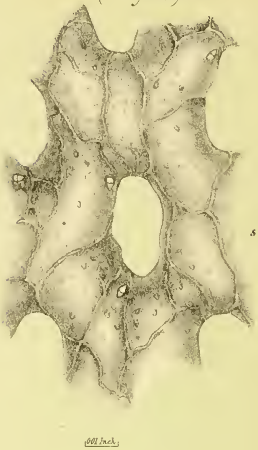
(Polyzoa)



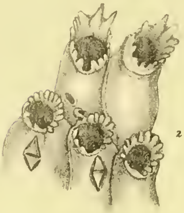
4



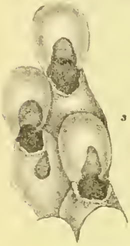
1



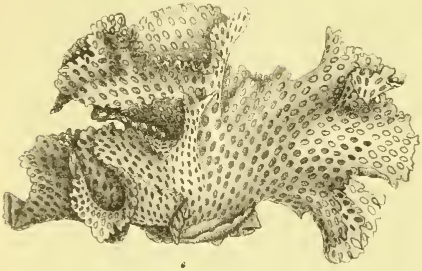
5



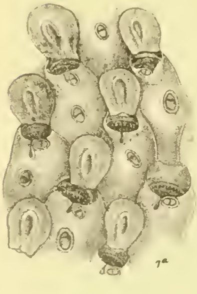
2



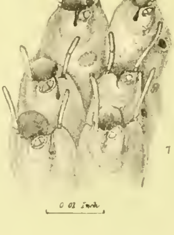
3



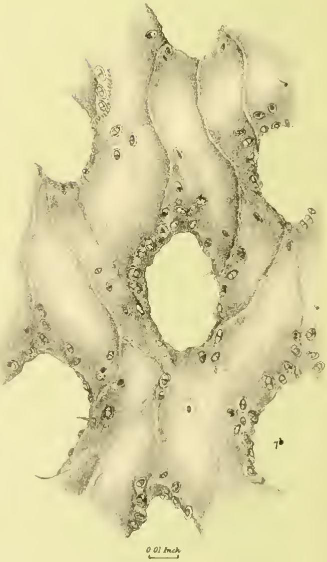
6



7a



7



7b

H. McC. & J. B. de[illegible] [illegible] Tipper lith

Prof. McCoy direx

Steam litho. Govt. Printing Office

PLATE 98, FIGS. 1–5.

RETEPORA PHŒNICEA (BUSK).

DESCRIPTION.—Polyzoary expanded, foliaceous, convoluted; fenestræ small, rounded, or elliptical, narrower than the interspaces; cells enlarged upwards, separated by narrow, raised lines; surface smooth or perforated by a few large foramina; mouth rounded, projecting forwards, in youngest cells with a fringe of short spinous processes or serratures and a sinus below, in older with an entire or slightly serrated margin, and usually a minute rounded sinus on the lower lip; operculum broad, rounded, with the muscular impressions small, round, and at a distance from the margin; a broad avicularium with sharply triangular mandible below the mouth; ovicell rounded, sub-immersed, the lower part with a broad mesial plate curving downwards and backwards; posterior surface nearly smooth or sub-granular, with numerous prominent vibices and a few minute avicularia.

REFERENCES.—Busk, Brit. Mus. Cat., Mar. Polyzoa; Hincks, Ann. and Mag. Nat. Hist., May 1878.

Port Phillip Heads; Portland, Mr. Maplestone; King's Island, Mr. McGowan.

This species forms small, convoluted masses of a beautiful vivid red colour. The finest specimen I have seen is that figured. The cells, which are separated by narrow raised lines, are smooth or sub-granular, and have usually several rounded foramina towards the margins. These are commonly arranged in two pairs, one on the upper part near the mouth, the other towards the base. In a young specimen, $\frac{1}{8}$th of an inch in diameter, for which I am indebted to Mr. Wilson, the cells have the mouth nearly circular with a thick fringe of short processes, longest above, but not developed into distinct spines, connected by an intermediate calcareous expansion. In old cells the peristome is smooth and little prominent, or projects more and is obscurely serrated; there is also usually, but not always, a small rounded sinus in the lower lip. In most cells there is a large avicularium below the mouth, with a broad, sharply triangular mandible directed upwards. The ovicells are very conspicuous. They are white, sub-immersed, and at the lower part have a broad mesial plate which curves downwards and backwards, leaving a rounded notch on each side. Their surface is frequently marked by narrow raised lines which in many cases seem to mark the lateral boundaries of the incurved plate. The dorsal surface is sub-granular, with numerous, sharply-raised vibices. The avicularia are very sparse, small, and with triangular mandibles. They are mostly situated close to the margins of the fenestræ. The operculum differs from that of all the other Victorian Retepores in having the occlusor muscles attached to small round impressions at a distance from the margins.

EXPLANATION OF FIGURES.

PLATE 98.—Fig. 1, specimen, natural size. Fig. 2, group of young marginal cells, from another, very small, growing specimen, magnified. Fig. 3, small group, showing partially developed ovicells. Fig. 4, group with fully formed ovicells. Fig. 5, portion of the back of the polyzoary, magnified half the dimensions of the other enlarged views.

PLATE 98, FIGS. 6–7.

RETEPORA AURANTIACA (P. McG.).

DESCRIPTION.—Polyzoary expanded, foliaceous, convoluted; fenestræ elliptical or oval, about the same width as the interspaces; cells quadrate, separated by narrow raised margins; mouth rounded above, straight below, with a deep narrow sinus, on one side of which is a rounded avicularium; a long, jointed spine articulated on each side of the mouth; operculum large, much wider than high, hollowed at the sides inferiorly; usually a round avicularium on the front of the cell; ovicell large, pyriform, with a vertical, narrow fissure, wider above, and with thickened margins; dorsal surface strongly vibicate, granular, and with numerous small, rounded avicularia, especially abundant near the fenestræ.

REFERENCE.—P. H. MacGillivray, Trans. Roy. Soc. Vict., 1882.

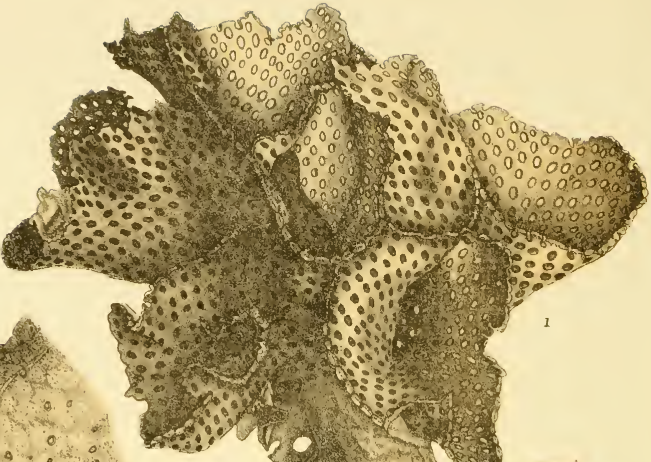
Port Phillip Heads.

The largest complete specimen I have seen is three inches wide by about two in the other diameters. The base of attachment is about an inch long. The avicularium on the front of the cell is by no means constant. The ovicells are abundant, and have a very distinctive appearance; with growth the vertical slit is sometimes filled in, leaving a slightly prominent ridge. It is an exceedingly handsome species of a beautiful orange colour.

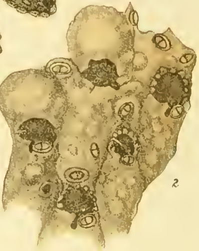
EXPLANATION OF FIGURES.

PLATE 98.—Fig. 6, specimen, natural size. Fig. 7, cells near the margin, magnified. Fig. 7*a*, another portion of the same, showing the ovicells. Fig. 7*b*, portion of the dorsal surface, magnified to half the dimensions of the others.

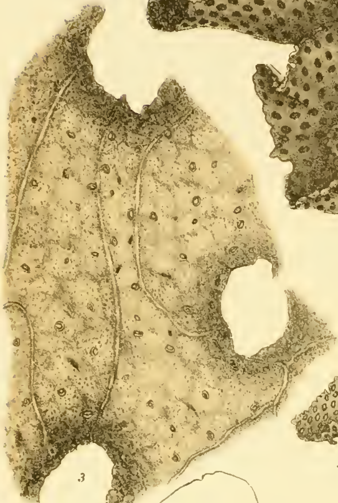
(Polyzoa.)



1

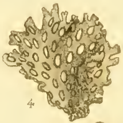


2

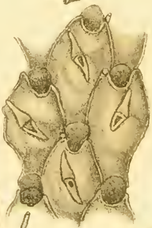


3

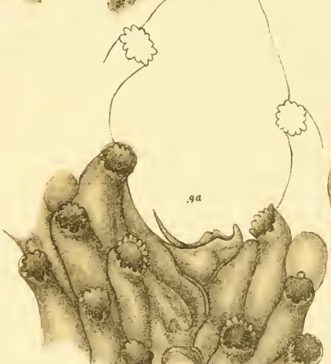
9



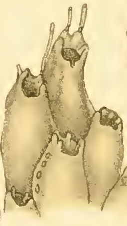
4



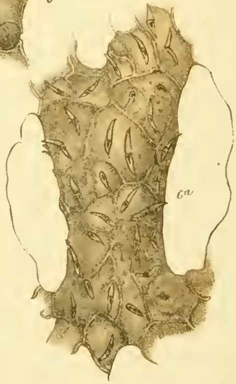
6



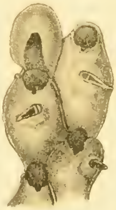
9a



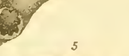
7



6a



8



5

$\frac{1}{100}$ Inch

P. H. McG. & J. R. del. J. Rapper lith.

Prof. McCoy direxit

Steam litho. Govt. Printing Office

PLATE 99, FIGS. 1–3.

RETEPORA GRANULATA (P. McG.).

DESCRIPTION.—Polyzoary massive, convoluted; fenestræ rounded, small, much narrower than the interspaces; cells elongated, separated by narrow, raised lines; mouth arched above, straight below, lower lip with a narrow vertical sinus, on one side of which is a rounded avicularium; operculum much wider than high; surface of cells granular or tuberculate; numerous small oval avicularia scattered over the cells, and a few larger situated on rounded elevations; ovicell large, rounded, granular; dorsal surface granular, vibicate, with small, scattered, rounded avicularia.

REFERENCES.—P. H. MacGillivray, Tr. Roy. Soc. Vict., 1869 and 1882; Hincks, Ann. and Mag. Nat. Hist., May 1878.

Port Phillip Heads.

This is the most massive of our Australian species, and attains a large size, the specimen figured measuring four inches high by the same width. It is of a brownish colour. In addition to the usual granulations over the surface, in many cases there is a row forming small processes on the upper margin of the mouth. The young ovicell is fissured, the fissure becoming filled in as calcification advances. In some specimens there are numerous rounded avicularia scattered over the cells and ovicells, occasionally raised on small elevations. There are also other large avicularia with triangular mandibles on large mound-like elevations.

EXPLANATION OF FIGURES.

PLATE 99.—Fig. 1, specimen, natural size. Fig. 2, portion of another specimen, magnified. Fig. 3, portion to show the dorsal surface, magnified half as much.

PLATE 99, FIGS. 4–8.

RETEPORA TESSELLATA (HINCKS).

DESCRIPTION.—Polyzoary small, foliaceous, convoluted; fenestræ elongated, usually narrower than the interspaces; cells oval or rhomboidal, separated by narrow, raised lines; mouth higher than broad, with a projecting angle on each side, where the raised cell-margin originates, caused by abrupt sloping backwards; lower lip deeply concave, entire, or with a minute rounded sinus; operculum with a broad groove down the centre; an avicularium on the front of the cell, with a long narrow mandible; ovicell rounded, sub-immersed, excavated below; dorsal surface smooth or minutely tubercular, divided by numerous raised lines into irregular spaces, in each of which is usually situated a long narrow avicularium similar to those on the front of the cells.

Reference.—Hincks, Ann. and Mag. Nat. Hist., May 1878.

Port Phillip Heads, 12–15 fathoms.

The best specimens I have of this species are of small size, one measuring 1 by $\frac{3}{4}$ inch, and another $\frac{7}{8}$ by $\frac{3}{8}$. The fenestræ are large, much elongated, usually rather narrower than the interspaces. The cells are oval or irregularly rhomboidal ; they are separated by narrow raised lines which unite with the slightly thickened lateral margins of the mouth at about the middle, forming a conspicuous angle on each side. The mouth is higher than wide, the lower lip hollowed, slightly thickened, entire, or with a small rounded sinus. Immediately above the junction of the separating lines of the cells the mouth recedes, and the angle here formed frequently gives rise to a jointed spine. In young, growing cells the mouth is nearly round, with a fringe-like upper edge to which are articulated several long, slender spines. A similar border and spines are also frequently present in the marginal cells of older parts. On the front of the cell is an avicularium, frequently situated on an eminence, with a long pointed mandible directed transversely, obliquely, or vertically downwards. The ovicell is rounded, deeply notched below. This notch, however, is probably ultimately filled in. The back of the polyzoary is mapped out into irregular areas by narrow raised vibices, in each of which is one or occasionally two avicularia similar to those found on the front of the cells. The operculum is very peculiar. It is of small size, rounded above ; there is an inner mark, parallel to the free margin except that at about the middle on each side it is sharply inflected inwards ; down the centre is a wide groove, on each side of which, especially towards the base, the surface bulges forwards.

Explanation of Figures.

Plate 99.—Figs. 4 and 5, specimens, natural size. Fig. 6, group of cells, magnified. Fig. 6*a*, dorsal surface, showing the small areas, with narrow avicularia. Fig. 7, young cells, magnified. Fig. 8, small group, showing an ovicell.

Plate 99, Fig. 9.

RETEPORA SERRATA (P. McG.).

Description.—Polyzoary expanded; fenestræ about the same width as the interspaces, or slightly wider; cells much elongated, separated by raised lines; mouth nearly circular or oval, projecting forwards, with a small sinus below, and a fringe of about 12 short, pointed processes arranged round the margin; operculum higher than wide, contracted at the base; ovicell rounded, smooth; a sessile avicularium, with a long, narrow, pointed mandible at the bottom of each fenestra, opening directly upwards; dorsal surface obscurely tubercular, strongly vibicate.

Reference.—P. H. MacGillivray, Tr. Roy. Soc. Vict., 1882.

Port Phillip Heads, a single specimen.

The only specimen I have seen is the very perfect one figured. It forms a small expansion $\frac{3}{4}$ths of an inch in diameter, curved on itself on one side where it is attached to the calcareous tube of an annelid. The colour is leaden-grey. The cells are elongated, narrow, slightly expanded upwards, separated by narrow raised lines. In the youngest the mouth is smooth, the lower lip straight, slightly hollowed or with a slight sinus. The peristome is rapidly developed to form a serrated circle of small sharp teeth, projecting forwards; at the lower part of this circle is a small sinus. At the bottom of each fenestra is a sessile avicularium, the rostrum with a tooth on each side behind the strong curved apex, the mandible long, narrow, curved, and pointed. There are a few other large avicularia, situated on mound-like elevations on the cells, and with spatulate or linguiform mandibles. The back is obscurely tubercular, glistening, divided into numerous angular spaces by narrow, sharply-raised vibices; a few scattered, rounded avicularia are situated about the edges of the fenestræ.

Explanation of Figures.

Plate 99.—Fig. 9, specimen, natural size. Fig. 9*a*, portion, magnified.

I am indebted to my friend Mr. MacGillivray for this valuable series of *Reteporæ*, which he has contributed to the National Museum collections and this work.

Frederick McCoy.

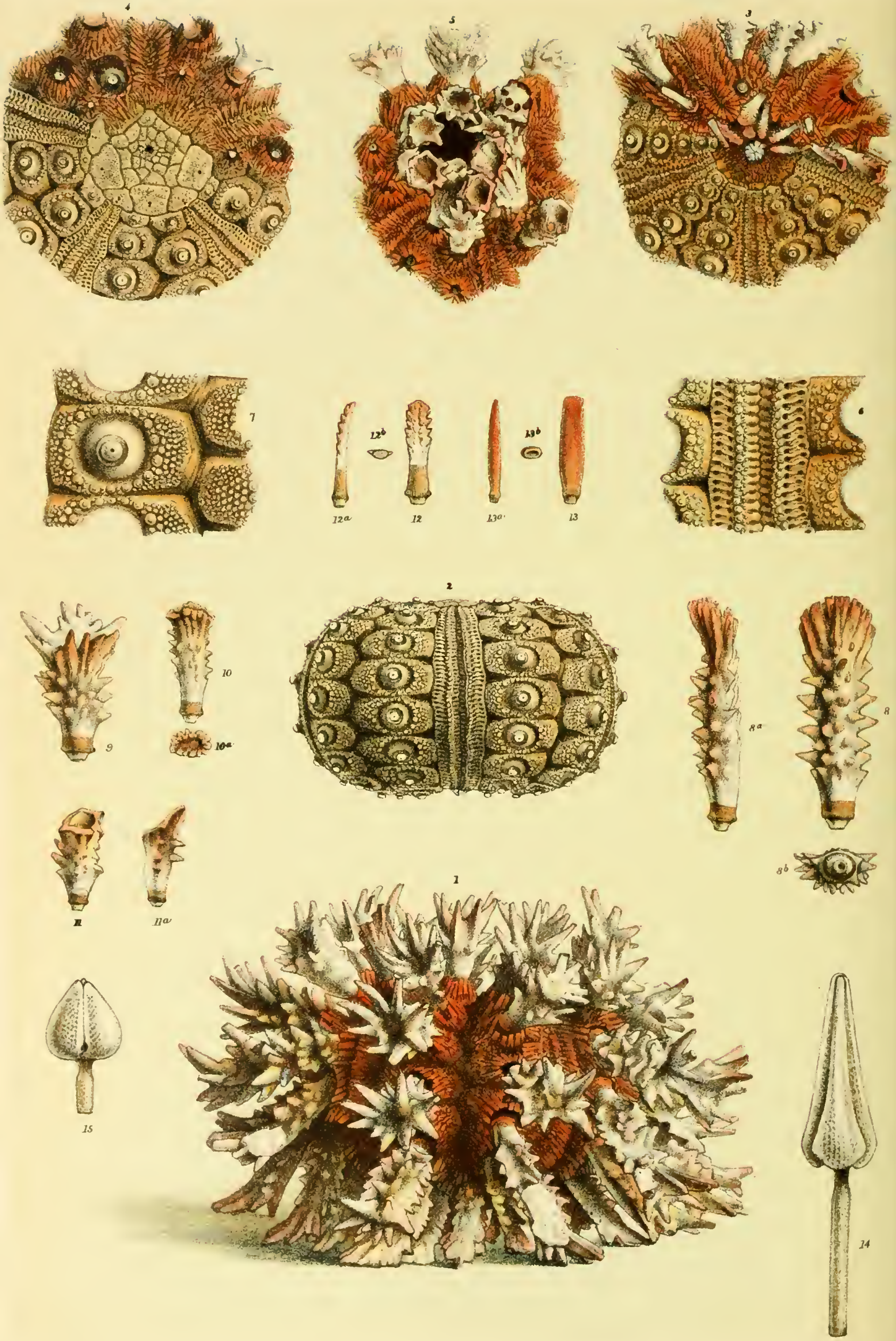

4
5
3
7
12a
12b
12
13a
13b
13
6
2
9
10
10a
8a
8
8b
11
11a
1
15
14

PLATE 100.

GONIOCIDARIS TUBARIA (LAM. SP.).

[Genus GONIOCIDARIS (DESORS.). (Sub-kingdom Radiata. Class Echinodermata. Order Echinoidea. Sub-order Desmosticha. Family Cidaridæ. Sub-family Goniocidarinæ.)

Gen. Char.—Test high, often higher than broad; coronal plates numerous; primary tubercles perforated, with smooth base. Ambulacra narrower than in other genera of the family; two porous bands nearly as broad as the intervening median ambulacral space; middle of the ambulacral and inter-ambulacral spaces bare, sutural edges of the ambulacral and inter-ambulacral plates sunk, forming zigzag depressed lines and pits at the angles of the plates, in which large spherical-headed pedicellariæ are lodged, one often to each pit. Spines cylindrical, often cupped at the tip, the sides tubercular or spinose, the thorny spinules often enlarged in whorls near tip of primary spines.]

DESCRIPTION.—Test moderately depressed. Primary tubercles eleven [*] in each vertical row; serobicular space transversely oval; mammary boss small, not prominent; a row (or, in some parts, two rows) of secondary tubercles round the serobicular area, 4 to 6 rows of small miliary tubercles concentric with the row of secondary serobicular tubercles on inner end of each inter-ambulacral plate, but a wide smooth margin to each plate forms smooth sunk zigzag line down middle of inter-ambulacrum; a narrow band of 3 or 4 rows of miliaries, between primary tubercle and band of ambulacral pores. Primary spines thick with blunt swollen tips, more or less flattened, those of vertex funnel-shaped at tip; the tip often with a radiating row of thorny spines; others cylindrical or flattened, and variously terminated by a fringe of longitudinal lamillæ; the underside generally smoother and flatter than the upper; all with conical, thorny spines on upper side, while their lower side has irregular, longitudinal rows of blunt tubercles, or is quite smooth towards the mouth; small primary spines nearest the mouth flat and smooth above and below, both sides serrated with a row of spines, tip bluntly truncated; secondary spines and papillæ flat, smooth, with wide, flat truncated tip; all the spines show irregular, longitudinal, obtusely granular lines under the lens. Plates of vertex, or abactinal system, with broad, smooth, sutural margins, but covered with miliary granules in centre; genital plates with very small ovarian opening near middle of central patch of miliary granules; ocular pores very small, double; ambulacra with broad bands of pores and a sunken, middle portion bare along centre, with two or three irregular rows of miliary granules at sides, within the two rows of secondary tubercles which border the two bands of pores. *Colour:* Plates brownish; primary spines yellowish or white-pinkish cream colour, with the tubercles and thorny spines red, chiefly on underside towards tips; secondary spines and papillæ rich cinabar red, yellowish at tip; pedicillaria pale dull red. *Measurements:* Diameter of test of an average specimen, 2 inches 6 lines; in proportion to diameter, taken as 100, depth of test $\frac{57}{100}$, diameter of oral aperture, or actinostom $\frac{25}{100}$, diameter of abactinal system or group of plates on vertex $\frac{34}{100}$, length of cupuliform spines round vertex $\frac{35}{100}$, width of ditto at tip $\frac{22}{100}$, length of longest spines at middle $\frac{55}{100}$ to $\frac{65}{100}$, width of ditto $\frac{27}{100}$, width of ambulacra at middle $\frac{15}{100}$, middle portion of ditto between the bands of pores $\frac{7}{100}$, width of inter-ambulacra at middle $\frac{44}{100}$, width of serobicular area at middle $\frac{14}{100}$, diameter of perforated primary tubercle at middle $\frac{5}{100}$.

REFERENCE.—*Cidarites tubaria* (Lamk.) Anim. sans Vert.

---

[*] Alex. Agassiz states the number to be eight (Rev. Ech. p. 397).

The beautiful specimens of this fine sea-urchin figured on our plate were presented by Mr. Bracebridge Wilson, who dredged them near Port Phillip Heads.

The diversity of the primary spines in different parts irregularly in a given specimen or in different specimens is wonderfully great. The general character of moderate depression, with long thorny spines on the edges, shorter conical thorns on the upper side, and blunt oval tubercles on the underside, is found in most of them; the whorl of thorns round the tip, either radiating obliquely upwards and outwards round a cup-shaped tip, or inclining so little outwards as sometimes to form only a lamellar fringe round the tip. The irregularity in size and shape not being connected definitely with position. The longitudinal rows of tubercles and thorns on each spine are irregular in number and in disposition. The five longitudinal irregular lines of blunt granules seen with a lens are not only on the surface between the tubercles and thorns, but encroach upon them a variable distance. The chief variations of these primary spines I have figured on the plate from our specimens. The secondary spines are only finely marked with granular longitudinal striæ, without thorns or tubercles; and are nearly uniform, flattened, and truncated at the tip.

The pedicillariæ are in greater abundance than in any other species I have seen. They are, as usual, of two sorts, one short-stemmed, and globular, the other much longer in the stem, and having the three-valved head of an elongate inversely club-shaped figure. They appear in all the depressions at the angles of the plates, both of the ambulacral and inter-ambulacral series.

This species is easily distinguished from the *Goniocidaris geranioides*, which also occurs in our seas, by the greater depression of the test, more thorny and larger primary spines, and by the comparatively very small size of the ovarian openings, which are a considerable distance within the margins, in the midst of a patch of miliary granules, while in *G. geranioides* they are very large and touching the margin. The idea occurs to me that *G. geranioides* may be the female and *G. tubaria* the male of one species, from the many points of resemblance, and the more striking difference of height and the very large ovarian openings being characters probably connected with development of the ovaries. The dissection of numerous individuals would be interesting as settling this point. The number of primary tubercles does not present the special difference thought by M. Agassiz, as these are certainly the same in both supposed species in all my specimens. The ocular pores seem double.

Not uncommon in Port Phillip and Western Port Bays on sandy bottoms, at about 40 fathoms.

EXPLANATION OF FIGURES.

PLATE 100.—Fig. 1, full-sized specimen, natural size. Fig. 2, test, denuded of spines, to show the proportion of the ambulacra and inter-ambulacra, with the perforated primary tubercles, imperforate secondary and miliary tubercles, bare margins and pits at angle of the plates, natural size. Fig. 3, oral region, partly denuded of spines, showing the teeth and small curved spines bent over the mouth, natural size. Fig. 4, apical region, partly denuded of spines, showing the very small ovarian openings far in from the edge in the patch of miliary granules, the margins of the plates bare; and the apparently double oculars, natural size. Fig. 5, portion of apical region with cup-tipped spines, natural size Fig. 6, portion of ambulacrum, showing the proportion of the two porous areæ to the middle area and the pairs of pores, row of secondary tubercles and miliary granules on the ambulacral plates, with the bare margins, depressions at angles, miliary granules, and row of secondary tubercles of the inter-ambulacral plates bordering the ambulacra, twice the natural size. Fig. 7, inter-ambulacral plates, showing the scrobicular area with the perforated primary tubercle in centre, the circle of imperforate secondary tubercles round the scrobicular area, and the rows of miliary granules not extending to the margins, which are left smooth, twice the natural size. Fig. 8, upper view of large primary spine, showing the plated modification of summit, natural size. Fig. 8*a*, side view of same, showing the sharp spines on the upper surface replaced by blunt tubercles on the lower surface. Fig. 8*b*, end view from below of same, to show the convexity of the thorny upper surface and the comparative flatness of the tuberculated under surface. Fig. 9, upper surface of one of the large primary spines, showing the obliquely radiated circle of long thorns round the funnel-shaped terminal cup. Fig. 10, smaller spine from oral region, natural size. Fig. 10*a*, top view of ditto. Fig. 11, truncated cup-shaped spine from apical region, natural size. Fig. 11*a*, side view of same. Fig. 12, upper side of small, curved spines round the mouth, magnified two diameters. Fig. 12*a*, side view of same, showing curvature towards smooth oral surface. Fig. 12*b*, section of same. Fig. 13, upper surface of secondary spine, showing its truncated tip and nearly parallel sides, three times natural size. Fig. 13*a*, same, viewed sideways. Fig. 13*b*, section. Fig. 14, the elongate form of pedicillaria from the edge of the ambulacra, magnified twenty diameters. Fig. 15, short globose sort of pedicillaria, magnified twenty diameters.

FREDERICK McCOY.

By Authority: JOHN FERRES, Government Printer, Melbourne.

PREFACE TO VOL. I.

It having been considered desirable to ascertain accurately the natural productions of the Colony of Victoria, and to publish works descriptive of them, on the plan of those issued by the Governments of the different States of America, investigations were undertaken, by order of the Victorian Government, to determine the Geology, Botany, and Zoology of the Colony, to form collections illustrative of each for the public use, and to make the necessary preparations for such systematic publications on the subject as might be useful and interesting to the general public, and contribute to the advancement of science.

As the geological and botanical investigations have already approached completion, and their publication is far advanced, it has been decided now to commence the publication of the third branch completing the subject, namely, that of the Zoology or indigenous members of the different classes of the animal kingdom.

As the Fauna is not so well known as the Flora, it was a necessary preliminary to the publication to have a large number of drawings made, as opportunity arose, from the living or fresh examples of many species of reptiles, fish, and the lower animals, which lose their natural appearance shortly after death, and the true characters of many of which were consequently as yet unknown, as they had

only been described from preserved specimens. A Prodromus, or preliminary issue, in the form of Decades, or numbers of ten plates, each with its complete descriptive letterpress, will be published, of such illustrations as are ready, without systematic order or waiting for the completion of any one branch. The many good observers in the country will thus have the means of accurately identifying various natural objects, their observations on which, if recorded and sent to the National Museum, where the originals of all the figures and descriptions are preserved, will be duly acknowledged, and will materially help in the preparation of the final systematic volume to be published for each class when it approaches completion.

The tenth Decade completes the first volume of the Prodromus of the Zoology of Victoria. A systematic index is given according to which the plates with their corresponding letterpress may be bound in zoological order, all the illustrations of each class being put together by those who desire it. Those who prefer to bind the plates and corresponding letterpress in the order of their original appearance, and as the plates are consecutively numbered, can do so, bringing the prefaces together at the front. An alphabetical index is also given of the contents; the generic, specific, and popular names being included, as well as the synonyms, which are in italics.

FREDERICK McCOY.

12th January, 1885.

SYSTEMATIC INDEX TO VOL. I.

SUB-KINGDOM I.—VERTEBRATA.

CLASS I.—MAMMALIA.

ORDER—FERÆ.

(*Section—Pinnipedia.*)

Family—Phocidæ.

(*Sub-family—Otarinæ.*)

	Plates
Euotaria	31, 71
Stenorhynchus	21

ORDER—CETACEA.

Family—Delphinidæ.

Delphinus	22

ORDER—MARSUPIALIA.

Family—Phalangistidæ.

Gymnobelideus	91

CLASS III.—REPTILIA.

(*Section—Squamata.*)

ORDER—SAURIA.

(*Sub-order—Leptoglossæ.*)

(*Tribe—Cyclosauræ.*)

Family—Monitoridæ.

Hydrosaurus	41

(*Tribe—Geissosaura.*)

Family—Scincidæ.

Rhodona	51
Cyclodus	72, 94

(*Sub-order—Pachyglossæ.*)

(*Tribe—Strobilosaura.*)

Family—Agamidæ.

	Plates
Physignathus	81

ORDER—OPHIDIA.

Family—Pythonidæ.

Morelia	13

Family—Elapsidæ.

Diemenia	23
Pseudechys	1
Furina	32
Hoplocephalus	2, 3, 11
Vermicella	52

Family—Viperidæ. (?)

Acanthophis	12

(*Section—Cataphracta.*)

ORDER—CHELONIA.

(*Sub-order—Pleuroderes.*)

Family—Chelydidæ.

(*Sub-family—Hydraspidinæ.*)

Chelodina	92, 93
Chelymys	82, 83

ORDER—BATRACHIA.

(*Sub-order—Anoura.*)

(*Section—Opisthoglossa.*)

Family—Hylidæ.

Ranoidea	53

Family—Cystignathidæ.

Limnodynastes	42

Systematic Index.

CLASS IV.—PISCES.

(*Sub-class—Palæichthyes.*)

ORDER—PLAGIOSTOMATA.

(*Sub-order—Selachoidea.*)

FAMILY—CARCHARIIDÆ.

	Plates
Galeus	64
Zygæna	56
Mustelus	87

FAMILY—LAMNIIDÆ.

Carcharodon	74
Odontaspis	64
Alopecias	88

FAMILY—NOTIDANIDÆ.

Notidanus	43

FAMILY—SCYLLIDÆ.

Crossorhinus	43

FAMILY—SPINACIDÆ.

Acanthias	75

FAMILY—RHINIDÆ.

Rhina	34

FAMILY—PRISTIOPHORIDÆ.

Pristiophorus	56

(*Sub-order—Batoidei.*)

FAMILY—MYLIOBATIDÆ.

Myliobatis	63

(*Sub-class—Teleostea.*)

ORDER—ACANTHOPTERYGIA.

FAMILY—PERCIDÆ.

Lates	14
Arripis	16, 17
Oligorus	85, 86
Ctenolates	84

FAMILY—SPARIDÆ.

	Plates
Girella	73
Chrysophrys	4

FAMILY—SCORPÆNIDÆ.

Sebastes	33

FAMILY—TRICHIURIDÆ.

Thersites	44

FAMILY—CARANGIDÆ.

Trachurus	18

FAMILY—SCOMBERIDÆ.

Scomber	28
Thynnus	44

FAMILY—TRIGLIDÆ.

Trigla	6
Lepidotrigla	5

ORDER—ANACANTHINI.

FAMILY—GADOPSIDÆ.

Gadopsis	27

FAMILY—GADIDÆ.

Lotella	19
Pseudophysis	20

FAMILY—OPHIDIIDÆ.

Genypterus	27

ORDER—PHYSOSTOMI.

FAMILY—SCOPELIDÆ.

Aulopus	54, 55

ORDER—LOPHOBRANCHII.

FAMILY—SYNGNATHIDÆ.

Phyllopteryx	65
Hippocampus	65

SUB-KINGDOM II.—MOLLUSCA.

CLASS—CEPHALOPODA.

(*Sub-class—Antipedia.*)

ORDER—ACETABULIFERA.

(*Sub-order—Octopoda.*)

FAMILY—ARGONAUTIDÆ.

Plates
Argonauta 61, 62

(*Sub-order—Decapoda.*)

FAMILY—LOLIGIDÆ.

Sepioteuthis 76, 77

(*Section—Molluscoidea.*)

CLASS—POLYZOA.

ORDER—INFUNDIBULATA.

(*Sub-order—Cheilostomata.*)

FAMILY—CATENICELLIDÆ.

Catenicella 24, 89, 90

FAMILY—CELLULARIIDÆ.

Cellularia 49, 58
Emma 58
Menipea 58

FAMILY—SALICORNARIIDÆ.

Cellaria 49
Nellia 49
Tubucellaria 49

FAMILY—BICELLARIIDÆ.

Plates
Bicellaria 59
Bugula 59, 78
Stirparia 59

FAMILY—FLUSTRIDÆ.

Flustra 45
Carbasea 45
Diachoris 46
Spiralaria 46

FAMILY—GEMELLARIIDÆ.

Didymia 46
Dimetopia 46
Calwellia 46

FAMILY—MEMBRANIPORIDÆ.

Membranipora 25, 26, 36
Lepralia 35, 36, 37, 38
Biflustra 57

FAMILY—STEGANOPORELLIDÆ.

Steganoporella 60

FAMILY—ESCHARIDÆ.

Eschara 48
Caleschara 48
Retepora ... 94, 95, 96, 97, 98, 99
Dictyopora 47, 66, 67
Petralia 60

(*Sub-order—Cyclostomata.*)

FAMILY—CRISIIDÆ.

Crisia 39

FAMILY—IDMONEIDÆ.

Idmonea 68

Systematic Index.

SUB-KINGD. III.—ARTICULATA.

CLASS—CRUSTACEA.

ORDER—DECAPODA.

(*Section—Macroura.*)

FAMILY—ASTACIDÆ.

Plates
Astacopsis 15, 29
Astacoides 15, 29

CLASS—INSECTA.

ORDER—ORTHOPTERA.

(*Section—Ambulatoria.*)

FAMILY—PHASMIDÆ.

Tropidoderus 69, 70
Acrophylla 79
Podacanthus 80

ORDER—LEPIDOPTERA.

(*Section—Rhopalocera.*)

FAMILY—PAPILLIONIDÆ.

(*Sub-family—Pieridæ.*)

Pieris (Thyca) 9, 10

(*Section—Heterocera.*)

FAMILY—URANIIDÆ.

Agarista 8

FAMILY—HEPIALIDÆ.

Zeuzera (Eudoxyla) 30

FAMILY—PSYCHIDÆ.

Plates
Entometa 40
Metura 40

ORDER—HEMIPTERA.

(*Tribe—Homoptera.*)

(*Section—Trimera.*)

FAMILY—CICADIDÆ.

Cicada 50
Cyclochila 50

CLASS—ANNELIDA.

ORDER—ABRANCHIATA.

(*Section—Terricola.*)

FAMILY—LUMBRICIDÆ.

Megascolides 7

SUB-KINGDOM IV.—RADIATA.

CLASS—ECHINODERMATA.

ORDER—ECHINOIDEA.

(*Sub-order—Desmosticha.*)

FAMILY—CIDARIDÆ.

Goniocidaris 100

CONTENTS OF DECADES.

N.B.—The originals of all the Figures are in the National Museum, Melbourne.

DECADE I.

Plate 1.—The Black Snake (Pseudechys porphyriacus, Shaw sp.).
Plate 2.—The Copper-head Snake (Hoplocephalus superbus, Günth.).
Plate 3.—The Tiger Snake (Hoplocephalus curtus, Schl. sp.).
Plate 4.—The Australian Bream (Chrysophrys Australis, Günth.).
Plate 5.—The Spiny-sided Butterfly-Gurnard (Lepidotrigla Vanessa, Rich. sp.).
Plate 6.—The Kumu Gurnard (Trigla Kumu, Lesson and Garn.).
Plate 7.—The Australian Giant Earth-worm (Megascolides Australis, McCoy).
Plate 8.—Lewin's Day-moth (Agarista Lewini, Boisd.).
The Loranthus Day-moth (Agarista Casuarinæ, Scott).
The Vine Day-moth (Agarista Glycine, Lewin sp.).
Plate 9.—Pieris (Thyca) Harpalyce (Don. sp.).
Plate 10.—Pieris (Thyca) Aganippe (Don. sp.).

DECADE II.

Plate 11.—The Little Whip Snake (Hoplocephalus flagellum, McCoy). The White-lipped Snake (Hoplocephalus coronoides, Günth.).
Plate 12.—The Death Adder (Acanthophis Antarctica, Shaw sp.).
Plate 13.—The Carpet Snake (Morelia variegata, Gray).
Plate 14.—The Gippsland Perch (Lates colonorum, Günth.).
Plate 15.—The Murray Lobster (Astacoides serratus, Shaw sp.).
Plate 16.—The Salmon Arripis (Arripis truttaceus, Cuv. sp.). Adult.
Plate 17.—Ditto of the younger forms and coloring.
Plate 18.—The Horse Mackerel (Trachurus trachurus, Lin. sp.).
Plate 19.—The Small-scaled Rock Cod (Lotella callarias, Günth.).
Plate 20.—The Australian Rock Cod (Pseudophysis barbatus, Günth.).

DECADE III.

Plate 21.—The Sea-Leopard Seal (Stenorhynchus leptonyx, de Blainv. sp.).
Plate 22.—The Yellow-sided Dolphin (Delphinus Novæ Zealandiæ, Quoy and Gaim.).
Plate 23.—The Common Brown Snake (Diemenia superciliosa, Fisch.).
The Small-scaled Brown Snake (Diemenia microlepidota, McCoy).
The Shield-fronted Brown Snake (Diemenia aspidorhyncha, McCoy).
Plate 24.—Catenicella margaritacea (Busk).—C. plagiostoma (Busk).—C. ventricosa (Busk).—C. hastata (Busk.)—C. rufa (McG.).—C. cribraria (Busk).—C. alata (Wyv. Thomson).—C. lorica (Busk).—C. formosa (Busk).—C. elegans (Busk).—C. perforata (Busk).—C. Buskii (Wyv. Thomson).—C. Hannafordi (McG.).—C. crystallina (Wyv. Thomson).—C. carinata (Busk).—C. aurita (Busk).—C. geminata (Wyv. Thomson).—C. cornuta (Busk).—C. intermedia (McG.)
Plate 25.—Membranipora membranacea (Linn. sp.).—M. perforata (McG.).—M. ciliata (McG.).—M. mamillaris (McG.).—M. umbonata (Busk).—M. pilosa (Linn. sp.).—M. cervicornis (Busk).
Plate 26.—Membranipora dispar (McG.).—M. Woodsii (McG.).—M. lineata (Linn. sp.).—M. Rosselii (Audouin sp.).—M. Lacroixii (Savigny sp.).
Plate 27.—The Australian Rockling (Genypterus Australis, Cast.).
The Yarra Blackfish (Gadopsis gracilis, McCoy).
Plate 28.—The Southern Mackerel (Scomber pneumatophorus, De la Roche).
Plate 29.—The Yabber Crayfish (Astacoides bicarinatus, Gray sp.).
Plate 30.—The Large Wattle Goat-Moth (Zeuzera Eucalypti, Boisd. Herr.-Schæf.).

CONTENTS OF DECADES.

DECADE IV.

Plate 31.—The Australian Sea-Bear or Fur-Seal (Euotaria cinerea, Péron sp.).
Plate 32.—The Two-hooded Furina-Snake, Furina bicucullata (McCoy).
Plate 33.—The Banded Red Gurnet-Perch (Sebastes percoides, Solander sp.).
Plate 34.—The Angel-fish (Rhina squatina, Lin. sp.).
Plate 35.—Lepralia circinata (McG.).—L. Cecilii (Aud.).—L. diaphana (McG.).—L. marsupium (McG.).—L. subimmersa (McG.).—L. anceps (McG.).—L. Maplestonei (McG.).
Plate 36.—Lepralia vittata (McG.).—Membranipora perforata. Lepralia Brogniartii (Aud.).—L. elegans (McG.).—L. pertusa (Esper. sp.).—L. Malusii (Aud. sp.).—L. lunata (McG.).
Plate 37.—Lepralia ciliata (Linn. sp.).—L. trifolium (McG.).—L. cheilodon (McG.).—L. canaliculata (McG.).—L. larvalis (McG.).—L. diadema (McG.).—L. papillifera (McG.).—L. Ellerii (McG.).
Plate 38.—Lepralia monoceros (Busk).—L. excavata (McG.).—L. vitrea (McG.).—L. megasoma (McG.).—L. Schizostoma (McG.).—L. Botryoides (McG.).—L. ferox (McG.).—L. pellucida (McG.).
Plate 39.—Crisia Edwardsiana (D'Orb. sp.).—C. biciliata (McG.).—C. acropora (Busk).—C. setosa (McG.).—C. tenuis (McG.).
Plate 40.—Saunders' Case-Moth (Metura elongata, Saunders sp.).
The Lictor Case-Moth (Entometa ignobilis, Walk.).

DECADE V.

Plate 41.—The Lace Lizard (Hydrosaurus varius, Shaw sp.).
Plate 42.—The Spotted Marsh-Frog (Limnodynastes Tasmaniensis, Günth.).—The Common Sand-Frog (Limnodynastes dorsalis, Gray).
Plate 43.—The Carpet Shark (Crossorhinus barbatus, Lin. sp.).—The Seven-gilled Shark (Notidanus [Heptanchus] Indicus, Cuv.).
Plate 44.—The Barracouta (Thersites atun, Cuv.).—The Tunny (Thynnus Thynnus, Lin. sp.).
Plate 45.—Flustra denticulata (Busk).—Carbasea episcopalis (Busk).—C. dissimilis (Busk).—C. indivisa (Busk).—C. elegans (Busk).—C. pisciformis (Busk).
Plate 46.—Spiralaria florea (Busk).—Diachoris Magellanica (Busk).—D. spinigera (P. McGil.).—Dimetopia spicata (Busk).—D. cornuta (Busk).—Didymia simplex (Busk).—Calwellia bicornis (Wyv. Thomson).
Plate 47.—Dictyopora cellulosa (P. McGil.).
Plate 48.—Eschara obliqua (P. McGil.).—E. dispar (P. McGil).—E. gracilis (Lamx.).—E. platalea (Busk).—E. quadrata (P. McGil.)—E. mucronata (P. McGil.).—Caleschara denticulata (P. McGil.).
Plate 49.—Cellaria fistulosa (Linn.).—C. hirsuta (P. McGil.).—C. tenuirostris (Busk.).—C. gracilis (Busk).—Nellia oculata (Busk).—Tubucellaria hirsuta (Busk).
Plate 50.—The Great Black, or Manna Cicada (Cicada mœrens, Germ.).—The Great Green Cicada (Cyclochila Australasiæ, Donov. sp.).

DECADE VI.

Plate 51.—The Victorian Rhodona (Rhodona Officeri, McCoy).
Plate 52.—The Black and White Ringed Snake (Vermicella annulata, Gray).
Plate 53.—The Green and Golden Bell-Frog (Ranoidea aurea, Less. sp.).
Plates 54-55.—The Australian Aulopus (Aulopus purpurisatus, Rich.).
Plate 56.—The Hammer-headed Shark (Zygæna malleus, Shaw).—The Common Australian Saw-Fish (Pristiophorus nudipinnis, Günth.).
Plate 57.—Biflustra perfragilis (McGil.).—B. delicatula (Busk).
Plate 58.—Cellularia cuspidata (Busk).—Menipéa crystallina (Gray sp.).—M. cyathus (Wyv. Thomson).—M. cervicornis (McGil.)—M. tricellata (Busk).—M. Buskii (Wyv. Thomson).
Plate 59.—Bicellaria tuba (Busk).—B. grandis (Busk).—B. ciliata (Linn).—B. turbinata (McGil.).—Stirparia annulata (Map.).—Bugula neritina (Linn.).
Plate 60.—Steganoporella magnilabris (Busk. sp.).—Petralia undata (McGil.).

CONTENTS OF DECADES.

DECADE VII.

Plate 61.—The Tuberculated Argonaut (Argonauta oryzata, Meusch.).
Plate 62.—The same seated in its so-called shell or Paper-Nautilus.
Plate 63.—The Blue-spotted Eagle-Ray (Myliobatis Australis, Macleay).
Plate 64.—The Long-toothed Bull-Shark (Odontaspis taurus, Raf.).—The Australian Tope Shark (Galeus Australis, Macleay).
Plate 65.—The Leafy Sea-Dragon (Phyllopteryx foliatus, Shaw sp.).—The Short-headed Sea-horse (Hippocampus breviceps, Pet.)
Plate 66.—Dictyopora grisea (Lamx. sp.).—D. albida (Kirch.)—(Var. avicularis, P. McGill.).
Plate 67.—D. Wilsoni (P. McGill.).
Plate 68.—Idmonea Milneana (d'Orb.).—I. contorta (P. McGill.).—I. radians (Lamk.).
Plates 69–70.—The Violet-shouldered Phasma (Tropidoderus iodomus, McCoy).—The Red-shouldered Phasma (Tropidoderus rhodomus, McCoy).

DECADE VIII.

Plate 71.—The Australian Sea-Bear or Fur-Seal (Euotaria cinerea, Péron sp.).
Plate 72.—The Northern Blue-tongued Lizard (Cyclodus gigas, Bodd. sp.).
Plate 73.—The Ludrick (Girella simplex, Rich. sp.).
Plate 74.—The White Shark (Carcharodon Rondeletii, Müll. and Hen.).
Plate 75.—The Picked Dog-Fish (Acanthias vulgaris, Linn. sp.).
Plates 76–77.—The Australian Tooth-cupped Cuttlefish (Sepioteuthis Australis, Quoy and Gaim.).
Plate 78.—Bugula robusta (P. McGil.).—B. cucullata (Busk).—B. dentata (Lamx.).—B. avicularia (Pall.).
Plate 79.—The Violet-winged Phasma (Acrophylla violascens, Leach sp.).
Plate 80.—The Large Pink-winged Phasma (Podacanthus typhon, Gray).

DECADE IX.

Plate 81.—The Gippsland Water Lizard (Physignathus Lesueri, Gray)—(Var. Howitti, McCoy).
Plates 82–83.—The Murray Tortoise (Chelymys Macquaria, Cuv. sp.).
Plate 84.—The Murray Golden Perch (Ctenolates ambiguus, Rich. sp.).
Plates 85–86.—The Murray Cod-Perch (Oligorus Macquariensis, Cuv. and Val. sp.).
Plate 87.—The Australian Smooth-Hound (Mustelus Antarcticus, Günth.).
Plate 88.—The Thresher, or Long-tailed Shark (Alopecias vulpes, Linn. sp.).
Plate 89.—Catenicella intermedia (P. McG.).—C. amphora (Busk).—C. Wilsoni (P. McG.).—C. pulchella (Map.).—C. utriculus (P. McG.).
Plate 90.—Catenicella fusca (P. McG.).—C. umbonata (Busk).—C. cornuta (Busk).

DECADE X.

Plate 91.—Gymnobelideus Leadbeateri (McCoy).
Plates 92–93.—The Long-necked River Tortoise (Chelodina longicollis, Shaw sp.).
Plate 94.—Opercula of Retepora.
Plate 95.—Retepora porcellana (P. McGil.).—R. avicularis (P. McGil.).—R. fissa (P. McGil.).
Plate 96.—Retepora monilifera (P. McGil.).
Plate 97.—Retepora monilifera (P. McGil.).—R. formosa (P. McGil.).—R. carinata (P. McGil.).
Plate 98.—Retepora Phœnicea (Busk).—R. aurantiaca (P. McGil.).
Plate 99.—Retepora granulata (P. McGil.).—R. tessellata (Hincks).—R. serrata (P. McGil.).
Plate 100.—Goniocidaris tubaria (Lam.).

ALPHABETICAL INDEX TO VOL. I.

(The Synonyms are printed in *Italics*. The numerals refer to the plates.)

A.

Acanthias squalus, 75.
Acanthias vulgaris, 75.
Acanthophis Antarctica, 12.
Acanthophis Browni, 12.
,, *cerastinus*, 12.
acanthophis, *Vipera*, 12.
Acrophylla violascens, 79.
acropora, Crisia, 39.
acutirostris (var.), Retepora monilifera, form munita, 94, 96.
Adder, Deaf, 12.
Adder, Death, 12.
Adeona grisea, 66.
Aganippe, Pieris (Thyca), 10.
Agarista, Casuarinæ, 8.
,, Glycine, 8.
,, Lewini, 8.
alata, Catenicella, 24.
albida (avicularis), Dictyopora, 66.
Alopecias vulpes, 88.
altevelis, *Thersites*, 44.
ambigua, *Datnia (?)*, 84.
ambiguus, Ctenolates, 84.
Amphibolurus heterurus, 81.
amphora, Catenicella, 89.
anceps, Lepralia, 35.
Angel Fish, 34.
annulata, *Bicellaria*, 59.
annulata, Stirparia, 59.
,, Vermicella, 52.
Antarctica, Acanthophis, 12.
Antarctica, *Boa*, 12.
Antarcticus, Mustelus, 87.
appendiculatus, *Squalus*, 43.
Argonauta nodosa, 61, 62.
Argonauta oryzata, 61, 62.
Argonauta tuberculata, 61, 62.
,, *tuberculosa*, 61, 62.
Argonaut, or Paper Nautilus, Tuberculated, 61, 62.
armatus, *Astacus*, 15.
Arripis, Salmon, 16, 17.
,, truttaceus, 16, 17.
aspidorhyncha, Diemenia, 23.
Astacoides bicarinatus, 29.
,, serratus, 15.
Astacoides spinifer, 15.
Astacopsis bicarinatus, 29.
,, serratus, 15.
Astacus armatus, 15.
,, *bicarinatus*, 29.
atun, Thersites, 44.
Aulopus, Australian, 54, 55.
Aulopus Milesi, 54, 55.
Aulopus purpurisatus, 54, 55.
aurantiaca, Retepora, 94, 98.
auratus, *Dules*, 84.
aurea, *Rana*, 53.
aurea, Ranoidea, 53.
aurita, Catenicella, 24.
Australasiæ, Cyclochila, 50.
Australasiæ, *Tettigonia*, 50.
Australian Aulopus, 54, 55.
,, Bream, 4.
,, Giant Earth-Worm, 7.
,, Rock Cod, 20.
,, Rockling, 27.
,, Saw-Fish, Common, 56.
,, Sea-Bear or Fur-Seal, 31, 71.
,, Smooth-Hound, 87.
,, Tooth-cupped Cuttlefish, 76, 77.
,, Tope Shark, 64.
Australis, Chrysophrys, 4.
,, Galeus, 64.
,, Genypterus, 27.
Australis, *Hydraspis*, 82, 83.
Australis, Idmonea, 68.
,, Megascolides, 7.
,, Myliobatis, 63.
,, Sepioteuthis, 76, 77.
avicularia, Bugula, 78.
(avicularis), Dictyopora albida, 66.
avicularis, Retepora, 94, 95.

B.

Banded Red Gurnet-Perch, 33.
barbatus, Crossorhinus, 43.
,, Pseudophysis, 20.
barbatus, *Squalus*, 43.
Barracouta, 44.
Bear, Fur-Seal or Sea-, 31, 71.
Bell-Frog, Green and Golden, 53.
bicarinatus, Astacopsis, 29.
bicarinatus, *Astacus*, 29.
Bicellaria annulata, 59.
Bicellaria ciliata, 59.
,, grandis, 59.
,, tuba, 59.
,, turbinata, 59.
biciliata, Crisia, 39.
bicornis, Calwellia, 46.
bicucullata, Furina, 32.
Biflustra delicatula, 57.
Biflustra fragilis, 57.
Biflustra perfragilis, 57.
Blackfish, Yarra, 27.
,, Gibbose, 27.
Black Snake, 1.
Black or Manna Cicada, Great, 50.
Black- and White-Ringed Snake, 52.
blacodes (?), *Genypterus*, 27.

Alphabetical Index.

Blue-spotted Eagle-Ray, 63.
Blue-tongued Lizard, Northern, 72.
Boa Antarctica, 12.
Boddaerti, Cyclodus, 72.
Botryoides, Lepralia, 38.
Bream, Australian, 4.
breviceps, Hippocampus, 65.
Brogniartii, Lepralia, 36.
Browni, Acanthopis, 12.
Brown Snake, Common, 23.
,, Shield-fronted, 23.
,, Small-scaled, 23.
Bugula avicularia, 78.
,, cucullata, 78.
,, dentata, 78.
,, neritina, 59.
,, robusta, 78.
Bull-Shark, Long-toothed, 64.
Buskii, Catenicella, 24.
,, Menipea, 58.
Butterfly-Gurnard, Spiny-sided, 5.

C.

Caleschara denticulata, 48.
callarias, Lotella, 19.
Calwellia bicornis, 46.
canaliculata, Lepralia, 37.
Cancer serratus, 15.
capensis, Carcharodon, 74.
Caranx trachurus, 18.
Carbasea, cyathiformis, 45.
Carbasea dissimilis, 45.
,, elegans, 45.
,, episcopalis, 45.
,, indivisa, 45.
,, pisciformis, 45.
Carcharias verus, 74.
Carcharius taurus, 64.
Carcharodon Rondeletii, 74.
Carcharodon Capensis, 74.
,, *lamia*, 74.
,, *verus*, 74.
carinata, Catenicella, 24.
,, Retepora, 94, 97.
Carpet Shark, 43.
,, Snake, 13.
Case-Moth, Lictor, 40.
,, Saunders', 40.
Casuarinæ, Agarista, 8.
Catenicella alata, 24.
,, amphora, 89.
,, aurita, 24.
,, Buskii, 24.
,, carinata, 24.
Catenicella concinna, 89.
Catenicella cornuta, 24, 90.
,, cribraria, 24.
,, crystallina, 24.
Catenicella Dawsoni, 24.
Catenicella elegans, 24.
,, formosa, 24.
,, fusca, 90.
,, geminata, 24.
,, Hannafordi, 24.
,, hastata, 24.
,, intermedia, 24, 89
Catenicella æris, var., 24.
Catenicella lorica, 24.
,, margaritacea, 24.
,, perforata, 24.
,, plagiostoma, 24.
,, pulchella, 89.
,, rufa, 24.
Catenicella setigera, var., 24.
Catenicella umbonata, 90.
,, utriculus, 89.
,, ventricosa, 24.
,, Wilsoni, 89.
Cecilii, Lepralia, 35.
Cellaria fistulosa, 49.
,, gracilis, 49.
,, hirsuta, 49.
,, tenuirostris, 49.
Cellularia cuspidata, 58.
cellulosa, Dictyopora, 47.
Centropristes salar, 16, 17.
,, *Tasmanicus*, 16, 17.
,, *truttaceus*, 16, 17.
cerastinus, Acanthophis, 12.
cervicornis, Emma, 58.
cervicornis, Membranipora, 25.
,, Menipea, 58.
cheilodon, Lepralia, 37.
Chelemys Macquaria, 82, 83.
Chelodina longicollis, 92, 93.
Chelodina Novæ-Hollandiæ, 92, 93.
Chrysophrys Australis, 4.
Cicada, Great Black or Manna, 50.
,, Great Green, 50.
,, mærens, 50.
Cicada olivacea, 50.
Cidarites tubaria, 100.
ciliata, Bicellaria, 59.
,, Lepralia, 37.
,, Membranipora, 25.
cinerea, Euotaria, 31, 71.
cinerea, Otaria, 31, 71.
circinata, Lepralia, 35.
Cod, Australian Rock, 20.
,, Perch, Murray, 85, 86.
,, Small-scaled Rock, 19.
colonorum, Lates, 14.
Coluber porphyriacus, 1.
Common Australian Saw-Fish, 56.
,, Brown Snake, 23.
,, Sand-Frog, 42.
concinna, Catenicella, 89.
Copper-head Snake, 2.
cornuta, Catenicella, 24, 90.
,, Dimetopia, 46.
coronoides, Hoplocephalus, 11.
Crayfish, Murray, 15.
,, Yabber, 29.
,, Yabbie, 29.
Crenidens simplex, 73.
cribraria, Catenicella, 24.
Crisia acropora, 39.
,, biciliata, 39.
,, Edwardsiana, 39.
,, setosa, 39.
,, tenuis, 39.
Crisidia Edwardsiana, 39.
Crossorhinus barbatus, 43.

crystallina, Catenicella, 24.
crystallina, Lepralia, 35.
crystallina, Menipea, 58.
Ctenolates ambiguus, 84.
Ctenolates Macquariensis, 84.
cucullata, Bugula, 78.
curta, Naja, 3.
curtus, Hoplocephalus, 3.
cuspidata, Cellularia, 58.
Cuttlefish, Australian Tooth-cupped, 76, 77.
cyathiformis, Carbasea, 45.
cyathus, Menipea, 58.
Cyclochila Australasiæ, 50.
Cyclochila olivacea, 50.
Cyclodus Boddaerti, 72.
,, *flavigularis*, 72.
Cyclodus gigas, 72.
Cystignathus dorsalis, 42.

D.

Datnia (?) ambigua, 84.
Dawsoni, Catenicella, 24.
Day-Moth, Lewin's, 8.
,, Loranthus, 8.
,, Vine, 8.
Deaf Adder, 12.
Death Adder, 12.
delicatula, Biflustra, 57.
Delphinus Novæ Zealandiæ, 22.
dentata, Bugula, 78.
denticulata, Caleschara, 48.
denticulata, Eschara, 48.
denticulata Flustra, 45.
despecta, Entometa, 40.
Diachoris costata, 46.
,, Crotali, 46.
,, Magellanica, 46.
,, spinigera, 46.
diadema, Lepralia, 37.
diaphana, Lepralia, 35.
Dictyopora albida (avicularis), 66.
,, cellulosa, 47.
,, grisea, 66.
,, Wilsoni, 67.
Didymia simplex, 46.
Diemenia aspidorhyncha, 23.
,, microlepidota, 23.
,, superciliosa, 23.
Dimetopia cornuta, 46.
,, spicata, 46.
dispar, Eschara, 48.
,, Membranipora, 26.
dissimilis, Carbasea, 45.
Diura roseipennis, 79.
Dog-Fish, Picked, 75.
Dolphin, Yellow-sided, 22.
dorsalis, Cystignathus, 42.
dorsalis, Limnodynastes, 42.
Dragon, Leafy Sea-, 65.
Dules auratus, 84.
d'Urvillei, Eudoxyla, 30.

E.

Eagle-Ray, Blue-spotted, 63.
Earth-Worm, Australian Giant, 7.
Edwardsiana, Crisia, 39.
Edwardsiana, Crisidia, 39.
elegans, Carbasea, 45.
,, Catenicella, 24.
elegans, Eschara, 48.
elegans, Lepralia, 36.
elegans, Steganoporella, 60.
Ellerii, Lepralia, 37.
elongata, Metura, 40.
elongatus, Oiketicus, 40.
Emma cervicornis, 58.
Emys Macquaria, 82, 83.
Entometa despecta, 40.
,, ignobilis, 40.
episcopalis, Carbasea, 45.
Eschara denticulata, 48.
Eschara dispar, 48.
Eschara elegans, 48.
Eschara gracilis, 48.
,, mucronata, 48.
,, obliqua, 48.
,, platalea, 48.
,, quadrata, 48.
eucalypti, Zeuzera (Eudoxyla), 30.
Eudoxyla d'Urvillei, 30.
(Eudoxyla) eucalypti, Zeuzera, 30.
Euotaria cinerea, 31, 71.
excavata, Lepralia, 38.

F.

farciminoides, Salicornaria, 49.
ferox, Lepralia, 38.
Fish, Angel, 34.
,, Common Australian Saw-, 56.
,, Picked Dog-, 75.
fissa, Retepora, 94, 95.
fistulosa, Cellaria, 49.
flagellum, Hoplocephalus, 11.
flavigularis, Cyclodus, 72.
florea, Spiralaria, 46.
Flustra denticulata, 45.
Flustra Lacroixii, 26.
,, *lineata*, 26.
,, *membranacea*, 25.
,, *pilosa*, 25.
foliatus, Phyllopteryx, 65.
foliatus, Sygnathus, 65.
formosa, Catenicella, 24.
,, Retepora, 94, 97.
fragilis, Biflustra, 57.
Frog, Common Sand-, 42.
,, Green and Golden Bell-, 53.
,, Spotted Marsh-, 42.
Furina bicucullata, 32.
Furina-Snake, Two-hooded, 32.
Fur-Seal or Sea-Bear, 31, 71.
fusca, Catenicella, 90.

G.

Gadopsis gibbosus, 27.
,, gracilis, 27.
Galeus Australis, 64.
Genypterus Australis, 27.
Genypterus blacodes (?), 27.
,, *tigerinus*, 27.

geminata, Catenicella, 24.
Giant Earth-Worm, Australian, 7.
Gibbose Blackfish, 27.
gibbosus, Gadopsis, 27.
gigas, Cyclodus, 72.
gigas, Scincus, 72.
Gippslandica, Perichæta, 7.
Gippsland Perch, 14.
,, Water-Lizard, 81.
Girella simplex, 73.
Glycine, Agarista, 8.
Glycine, Phalænoides, 8.
Goat-Moth, Large Wattle, 30.
Golden Bell-Frog, Green and, 53.
Golden Perch, Murray, 84.
Goniocidaris tubaria, 100.
gracilis, Cellaria, 49.
,, Eschara, 48.
,, Gadopsis, 27.
gracilis, Salicornaria, 49.
grandis, Bicellaria, 59.
granulata, Retepora, 94, 99.
Great Black or Manna Cicada, 50.
,, Green Cicada, 50.
Green and Golden Bell-Frog, 53.
,, Cicada, Great, 50.
grisea, Adeona, 66.
grisea, Dictyopora, 66.
Grystes Macquariensis, 85, 86.
,, *Peeli*, 85, 86.
Gurnard, Spiny-sided, Butterfly-, 5.
,, Kumu, 6.
Gurnet-Perch, Banded Red, 33.
Gymnobelideus Leadbeateri, 91.

H.

Hammer-headed Shark, 56.
Hannafordi, Catenicella, 24.
Harpalyce, Papilio, 9.
Harpalyce, Pieris (Thyca), 9.
hastata, Catenicella, 24.
(Heptanchus) Notidanus Indicus, 43.
heterurus, Amphibolurus, 81.
Hippocampus breviceps, 65.
hirsuta, Cellaria, 49.
hirsuta, Onchopora, 49.
,, *Salicornaria*, 49.
hirsuta, Tubucellaria, 49.
hooded Furina-Snake, Two-, 32.
Hoplocephalus coronoides, 11.
,, curtus, 3.
,, flagellum, 11.
,, superbus, 2.
Horse-Mackerel, 18.
Horse, Short-headed Sea-, 65.
Hound, Australian Smooth-, 87.
Howitti, Physignathus Lesueri, var., 81.
Hydraspis Australis, 82, 83.
Hydrosaurus varius, 41.
Hyla Jacksoniensis, 53.

I.

Idmonea Australis, 68.
,, Milneana, 68.
,, radians, 68.
ignobilis, Entomcta, 40.
Iguana, 41.
Indicus, Notidanus (Heptanchus),
indivisa, Carbasea, 45.
intermedia, Catenicella, 24, 89.
iodomus, Tropidoderus, 69, 70.
Istiurus Lesueri, 81.

J.

Jacksoniensis, Hyla, 53.
,, *Ranoidea*, 53.

K.

Kumu Gurnard, 6.
,, Trigla, 6.

L.

Lace Lizard, 41.
Lacerta sincoides, 72.
,, *varia*, 41.
Lacroixii, Flustra, 26.
Lacroixii, Membranipora, 26.
lævis, Catenicella, var., 24.
lamia, Carcharodon, 74.
Large Pink-winged Phasma, 80.
,, Wattle Goat-Moth, 30.
larvalis, Lepralia, 37.
Lates Colonorum, 14.
laxa, Retepora porcellana, var., 94, 95.
Leadbeateri, Gymnobelideus, 91.
Leafy Sea-Dragon, 65.
Leopard Seal, Sea-, 21.
Lepidotrigla Vanessa, 5.
Lepralia anceps, 35.
,, Botryoides, 38.
,, Brogniartii, 36.
,, canaliculata, 37.
,, Cecilii, 35.
,, cheilodon, 37.
,, ciliata, 37.
,, circinata, 35.
Lepralia, crystallina, 35.
Lepralia diadema, 37.
,, diaphana, 35.
,, elegans, 36.
,, Ellerii, 37.
,, excavata, 38.
,, ferox, 38.
,, larvalis, 37.
,, lunata, 36.
,, Malusii, 36.
,, Maplestoni, 35.
,, marsupium, 35.
,, megasoma, 38.
,, monoceros, 38.
Lepralia mucronata, 48.
Lepralia papillifera, 37.
,, pellucida, 38.
,, perforata, 36.
,, pertusa, 36.
,, Schizostoma, 38.
,, subimmersa, 35.
,, trifolium, 37.
,, vitrea, 38.
,, vittata, 37.

leptonyx, *Phoca*, 21.
leptonyx, Stenorhynchus, 21.
Lesueri var. Howitti, Physignathus, 81.
Lesueri, *Istiuris*, 81.
,, *Lophura*, 81.
Lewini, Agarista, 8.
Lewin's Day-Moth, 8.
Lictor Case-Moth, 40.
Limnodynastes dorsalis, 42.
,, Tasmaniensis, 42.
lineata, *Flustra*, 26.
lineata, Membranipora, 26.
Ling, Australian Rock-, 27.
lipped Snake, White-, 11.
Little Whip-Snake, 11.
Lizard, Gippsland Water, 81.
,, Lace, 41.
,, Northern Blue-tongued, 72.
lobatus, *Squalus*, 43.
Lobster, Murray, 15.
longicollis, Chelodina, 92, 93.
longicollis, *Testudo*, 92, 93.
Long-necked River Tortoise, 92, 93.
Long-tailed Shark, Thresher or, 88.
Long-toothed Bull-Shark, or Shovel-nosed Shark, 64.
Lophura Lesueri, 81.
,, *Satiurus*, 81.
Loranthus Day-Moth, 8.
lorica, Catenicella, 24.
Lotella callarias, 19.
Ludrick, 73.
lunata (var.), Retepora monilifera, form munita, 94, 96.
lunulata, Lepralia, 36.

M.

Maccoyi, *Thynnus*, 44.
Mackerel, Horse-, 18.
,, Southern, 28.
Macquaria, *Emys*, 82, 83.
Macquaria, Chelymys, 82, 83.
Macquaria, *Platemys*, 82, 83.
Macquariensis, *Ctenolates*, 84.
Macquariensis, Grystes, 85, 86.
,, Oligorus, 85, 86.
mærens, Cicada, 50.
Magellanica, Diachoris, 46.
magnilabris, *Membranipora*, 60.
magnilabris, Seganoporella, 60.
malleus, Zygæna, 56.
Malusii, Lepralia, 36.
mamillaris, Membranipora, 25.
Manna Cicada, Great Black or, 50.
Maplestoni, Lepralia, 35.
margaritacea, Catenicella, 24.
marginata, *Perca*, 16, 17.
Marsh-Frog, spotted, 42.
marsupiata, *Retepora*, 95.
marsupium, Lepralia, 37.
Megascolides Australis, 7.
megasoma, Lepralia, 38.
membranacea, *Flustra*, 25.
membranacea, Membranipora, 25.
Membranipora cervicornis, 25.
Membranipora ciliata, 25.
,, dispar, 26.
,, Lacroixii, 26.
,, lineata, 26.
Membranipora magnilabris, 60.
Membranipora mamillaris, 25.
,, membranacea, 25.
,, perforata, 25, 36.
,, pilosa, 25.
,, Roselii, 26.
,, umbonata, 26.
,, Woodsii, 26.
Menipea Buskii, 58.
,, cervicornis, 58.
,, crystallina, 58.
,, cyathus, 58.
,, tricellata, 58.
Metura elongata, 40.
microlepidota, Diemenia, 23.
Milneana, Idmonea, 68.
Milesi, *Aulopus*, 54, 55.
monilifera, Retepora, 94, 95, 96.
,, ,, form munita, var. acutirostris, 94, 96.
,, ,, form munita, var. lunata, 94, 96.
,, ,, form munita, var. sinuata, 94, 96.
,, ,, form umbonata, 94, 97.
monoceros, Lepralia, 38.
Morelia variegata, 13.
Moth, Large Wattle Goat-, 30.
,, Lewin's Day-, 8.
,, Lictor Case-, 40.
,, Loranthus Day-, 8.
,, Saunders' Case-, 40.
,, Vine Day-, 8.
mucronata, Eschara, 48.
mucronata, *Lepralia*, 48.
munita (form), Retepora (monilifera var. acutirostris), 94, 96.
,, (form), Retepora (monilifera var. lunata), 94, 96.
Murray Cod-Perch, 85, 86.
,, Golden Perch, 84.
,, Lobster, 15.
,, Tortoise, 82, 83.
Mustelus Antarcticus, 87.
Myliobatis Australis, 63.

N.

Naja curta, 3.
Nautilus, Tuberculated Argonaut, or Paper-, 61, 62.
Nellia oculata, 49.
neritina, Bugula, 59.
nigroluteus, Cyclodus, 94.
nodosa, *Argonauta*, 61, 62.
Northern Blue-tongued Lizard, 72.
,, or Blotched Blue-tongued Lizard, 94.
Notidanus (Heptanchus) Indicus, 43.
Novæ-Hollandiæ, *Chelodina*, 92, 93.
Novæ Zealandiæ, Delphinus, 22.
nudipinnis, Pristiophorus, 56.

Alphabetical Index.

O.

obliqua, Eschara, 48.
Octopus raricyathus, 61, 62.
oculata, Nellia, 49.
Ocythoë raricyathus, 61, 62.
Odontaspis taurus, 64.
Officeri, Rhodona, 51.
Oiketicus elongatus, 40.
,, *Saundersi*, 40.
Oligorus Macquariensis, 85, 86.
olivacea, *Cicada*, 50.
,, *Cyclochila*, 50.
Onchopora hirsuta, 49.
Opercula of Retepora aurantiaca, 94.
,, ,, avicularis, 94.
,, ,, carinata, 94.
,, ,, fissa, 94.
,, ,, formosa, 94.
,, ,, granulata, 94.
,, ,, monilifera, 94.
,, ,, ,, form munita, var. acutirostris, 94.
,, ,, ,, form munita, var. lunata.
,, ,, ,, var. sinuata.
,, ,, ,, form umbonata.
,, ,, Phœnicea, 94.
,, ,, porcellana, 94.
,, ,, ,, var. laxa, 94.
,, ,, serrata, 94.
,, ,, tessellata, 94.
oryzata, Argonauta, 61, 62.
Otaria cinerea, 31, 71.

P.

Paper-Nautilus, Tuberculated Argonaut, or, 61, 62.
Papilio Harpalyce, 9.
papillifera, Lepralia, 37.
Peeli, Grystes, 85, 86.
pellucida, Lepralia, 38.
Perca marginata, 16, 17.
Perca trutta, 16, 17.
Perch, Banded Red Gurnet-, 33.
,, Gippsland, 14.
,, Murray Cod-, 85, 86.
,, ,, Golden, 84.
percoides, *Scorpæna*, 33.
percoides, Sebastes, 33.
perforata, Catenicella, 24.
,, Lepralia, 36.
,, Membranipora. 25, 36.
perfragilis, Biflustra, 57.
Perichæta Gippslandica, 7.
pertusa, Lepralia, 36.
Petralia undata, 60.
Phalænoides glycine, 8.
Phasma, Red-shouldered, 69, 70.
,, Large Pink-winged, 80.
Phasma, *violascens*, 79.
Phasma, Violet-shouldered, 69, 70.
,, Violet-winged, 79.
Phoca leptonyx, 21.
Phœnicea, Retepora, 94, 98.
Phyllopteryx foliatus, 65.
Physignathus Lesueri, var. Howitti, 81.
Picked Dog-Fish, 75.
Pieris (Thyca) Aganippe, 10.
,, ,, Harpalyce, 9.
pilosa, *Flustra*, 25.
pilosa, Membranipora, 25.
Pink-winged Phasma, Large, 80.
pisciformis, Carbasea, 45.
plagiostoma, Catenicella, 24.
platalea, Eschara, 48.
Platemys Macquaria, 82, 83.
pneumatophorus, Scomber, 28.
Podacanthus typhon, 80.
porcellana, Retepora, 94, 95.
,, var. laxa, Retepora, 94, 95.
porphyriacus, *Coluber*, 1.
porphyriacus, Pseudechys, 1.
Potamobius serratus, 15.
Pristiophorus nudipinnis, 56.
Pseudechys porphyriacus, 1.
Pseudoelaps superciliosus, 23.
Pseudophysis barbatus, 20.
pulchella, Catenicella, 89.
purpurisatus, Aulopus, 54, 55.

Q.

quadrata, Eschara, 48.

R.

radians, Idmonea, 68.
Rana aurea, 53.
Ranoidea aurea, 53.
Ranoidea Jacksoniensis, 53.
raricyathus, *Octopus*, 61, 62.
,, *Ocythoë*, 61, 62.
Ray, Blue-spotted Eagle-, 63.
Red Gurnet-Perch, Banded, 33.
Red-shouldered Phasma, 69, 70.
Retepora, aurantiaca, 94, 98.
,, avicularis, 94, 95.
,, carinata, 94, 96.
,, fissa, 94, 95.
,, formosa, 94, 97.
,, granulata, 94, 99.
,, laxa (var.), porcellana, 94, 95.
,, monilifera, 94, 95, 96.
,, ,, form munita, var. acutirostris, 94, 96.
,, ,, form munita, var. lunata, 94, 96.
,, ,, var. sinuata, 94, 96.
,, ,, form umbonata, 94, 97.
,, Phœnicea, 94, 98.
,, porcellana, 94, 95.
,, ,, var. laxa, 94.
,, serrata, 94, 99.
,, tessellata, 94, 99.
Rhina squatina, 34.
rhodomus, Tropidoderus, 69, 70.
Rhodona Officeri, 51.
,, Victorian, 51.
Ringed Snake, Black- and White-, 52.
River Tortoise, Long-necked, 92, 93.
robusta, Bugula, 78.

Rock Cod, Australian, 20.
,, Small-scaled, 19.
Rockling, Australian, 27.
Rondeletii, Carcharodon, 74.
roseipennis, *Diura*, 79.
Rosselii, Membranipora, 26.
rufa, Catenicella, 24.

S.

salar, *Centropristes*, 16, 17.
Salicornaria farciminoides, 49.
,, *gracilis*, 49.
,, *hirsuta*, 49.
,, *tenuirostris*; 49.
Salmon Arripis, 16, 17.
,, Trout, 16, 17.
Sand-Frog, Common, 42.
Satiurus Lesueri, 81.
Saunders' Case-Moth, 40.
Saundersi, *Oiketicus*, 40.
Saw-Fish, Common Australian, 56.
Schizostoma, Lepralia, 38.
scincoides, *Lacerta*, 72.
Scincus gigas, 72.
Scomber pneumatophorus, 28.
Scomber thynnus, 44.
,, *trachurus*, 18.
Scorpæna percoides, 33.
Sea-Bear or Fur-Seal, 31, 71.
Sea-Dragon, Leafy, 65.
Sea-Horse, Short-headed, 65.
Sea-Leopard Seal, 21.
Seal, Sea-Bear or Fur-, 31, 71.
,, Sea-Leopard, 21.
Sebastes percoides, 33.
Sepioteuthis Australis, 76, 77.
Sergeant Baker, 74, 75.
serrata, Retepora, 94, 99.
serratus, Astacoides, 15.
serratus, *Cancer*, 15.
,, *Potamobius*, 15.
setigera, *var. Catenicella*, 24.
setosa, Crisia, 39.
Seven-Gilled Shark, 43.
Shark, Australian Tope, 64.
,, Carpet, 43.
,, Hammer-headed, 56.
,, Long-tailed, or Thresher, 88.
,, Long-toothed Bull-, or Shovel-nosed, 64.
,, Seven-Gilled, 43.
,, Thresher, or Long-tailed, 88.
,, Tope, 64.
,, White, 74.
Shield-fronted Brown Snake, 23.
Short-headed Sea-Horse, 65.
Shovel-nosed Shark, or Long-toothed Bull-Shark, 64.
simplex, *Crenidens*, 73.
simplex, Didymia, 46.
,, Girella, 73.
sincoides, *Lacerta*, 72.
sinuata (var.), Retepora monilifera, 94.
Small-scaled Brown Snake, 23.
,, Rock Cod, 19.
Smooth-Hound, Australian, 87.
Snake, Black, 1.
,, Black- and White-Ringed, 52.
,, Brown, Common, 23.
,, ,, Shield-fronted, 23.
,, ,, Small-scaled, 23.
,, Carpet, 13.
,, Common Brown, 23.
,, Copper-head, 2.
,, Little Whip-, 11.
,, Shield-fronted Brown, 23.
,, Small-scaled Brown, 23.
,, Tiger, 3.
,, Two-hooded Furina-, 32.
,, Whip-, Little, 11.
,, White-lipped, 11.
Southern, or Blotched Blue-tongued Lizard, 94.
,, Mackerel, 28.
spicata, Dimetopia, 46.
spinifer, *Astacoides*, 15.
spinigera, Diachoris, 46.
Spiny-sided Butterfly-Gurnard, 5.
Spiralaria florea, 46.
Spotted Eagle-Ray, Blue-, 63.
,, Marsh-Frog, 42.
Squalus acanthias, 75.
,, *appendiculatus*, 43.
,, *barbatus*, 43.
,, *lobatus*, 43.
,, *squatina*, 34.
,, *vulpes*, 88.
,, *zygæna*, 56.
squatina, Rhina, 34.
squatina, *Squalus*, 34.
Steganoporella elegans, 60.
Steganoporella magnilabris, 60.
Stenorhynchus leptonyx, 21.
Stirparia annulata, 59.
subimmersa, Lepralia, 35.
superbus, Hoplocephalus, 2.
superciliosa, Diemenia, 23.
superciliosus, *Pseudoelaps*, 23.
Sygnathus foliatus, 65.
,, *tæniolatus*, 65.

T.

Tasmanicus, *Centropristes*, 16, 17.
Tasmaniensis, Limnodynastes, 42.
taurus, *Carcharius*, 64.
taurus, Odontaspis, 64.
tenuirostris, Cellaria, 49.
tenuirostris, *Salicornaria*, 49.
tenuis, Crisia, 39.
tessellata, Retepora, 94, 99.
Testudo longicollis, 92, 93.
Tettigonia Australasiæ, 50.
Thersites altivelis, 44.
Thersites atun, 44.
Thresher, or Long-tailed Shark, 88.
(Thyca) Pieris Aganippe, 10.
,, ,, Harpalyce, 9.
Thynnus Maccoyi, 44.
,, *Scomber*, 44.
Thynnus thynnus, 44.
Thynnus vulgaris, 44.
tigerinus, *Genypterus*, 27.
Tiger Snake, 3.

tæniolatus, *Sygnathus*, 65.
Tooth-cupped Cuttlefish, 76, 77.
Tope Shark, Australian, 64.
Tortoise, Long-necked River, 92, 93.
,, Murray, 82, 83.
trachurus, *Caranx*, 18.
,, *Scomber*, 18.
Trachurus trachurus, 18.
tricellata, Menipea, 58.
trifolium, Lepralia, 37.
Trigla Kumu, 6.
Tropidoderus iodomus, 69, 70.
,, rhodomus, 69, 70.
Trout, Salmon, 16, 17.
trutta, *Perca*, 16, 17.
truttaceus, Arripis, 16, 17.
truttaceus, *Centropristes*, 16, 17.
tuba, Bicellaria, 59.
tubaria, *Cidarites*, 100.
tubaria, Goniocidaris, 100.
tuberculata, *Argonauta*, 61, 62.
Tuberculated Argonaut, or Paper Nautilus, 61, 62.
tuberculosa, *Argonauta*, 61, 62.
Tubucellaria hirsuta, 49.
Tunny, 44.
turbinata, Bicellaria, 59.
Two-hooded Furina-Snake, 32.
typhon, Podacanthus, 80.

U.

umbonata, Catenicella, 90.
,, Membranipora, 25.
,, (form), Retepora monilifera, 94, 97.
undata, Petralia, 60.
utriculus, Catenicella, 89.

V.

Vanessa, Lepidotrigla, 5.
varia, *Lacerta*, 41.
variegata, Morelia, 13.
varius, Hydrosaurus, 41.
ventricosa, Catenicella, 24.
Vermicella annulata, 52.
verus, *Carcharias*, 74.
,, *Carcharodon*, 74.
Victorian Rhodona, 51.
Vine Day-Moth, 8.
violascens, Acrophylla, 79.
violascens, *Phasma*, 79.
Violet-shouldered Phasma, 69, 70.
Violet-winged Phasma, 79.
Vipera acanthophis, 12.
vitrea, Lepralia, 38.
vittata, Lepralia, 37.
vulgaris, Acanthias, 75.
vulgaris, *Thynnus*, 44.
vulpes, Alopecias, 88.
vulpes, *Squalus*, 88.

W.

Water Lizard, Gippsland, 81.
Wattle Goat-Moth, Large, 30.
Whip-Snake, Little, 11.
White-lipped Snake, 11.
White-Ringed Snake, Black- and, 52.
White Shark, 74.
Wilsoni, Catenicella, 89.
Wilsoni, Dictyopora, 67.
Woodsii, Membranipora, 26.
Worm, Australian Giant Earth-, 7.

Y.

Yabber Crayfish, 29.
Yabbie Crayfish, 29.
Yarra Blackfish, 27.
Yellow-sided Dolphin, 22.

Z.

Zeuzera (Eudoxyla) eucalypti, 30.
Zygæna malleus, 56.
zygæna, *Squalus*, 56.

CORRIGENDA ET ADDENDA.

Letterpress of Plate 42, for *Lymnodynastes*, read *Limnodynastes*.

Letterpress of Plates 16, 17—References, for *? Perca trutta* (Cuv. & Val.), Hist. Nat. des Poiss., v. 4, p. 54, read vol. 2; add *Perca marginata* (Cuv. & Val.), Hist. Nat. des Poiss., v. 2, p. 53.

By Authority: John Ferres, Government Printer, Melbourne.

CONTENTS OF DECADE X.

N.B.—The originals of all the Figures are in the National Museum, Melbourne.

Plate 91.—Gymnobelideus Leadbeateri (McCoy).

Plates 92–93.—The Long-necked River Tortoise (Chelodina longicollis, Shaw sp.).

Plate 94.—Opercula of Retepora.

Plate 95.—Retepora porcellana (P. McGil.).—R. avicularis (P. McGil.).—R. fissa (P. McGil.).

Plate 96.—Retepora monilifera (P. McGil.).

Plate 97.—Retepora monilifera (P. McGil.).—R. formosa (P. McGil.).—R. carinata (P. McGil.).

Plate 98.—Retepora Phœnicea (Busk).—R. aurantiaca (P. McGil.).

Plate 99.—Retepora granulata (P. McGil.).—R. tessellata (Hincks).—R. serrata (P. McGil.).

Plate 100.—Goniocidaris tubaria (Lam.).

JAN 1955

MARY D. ROGICK